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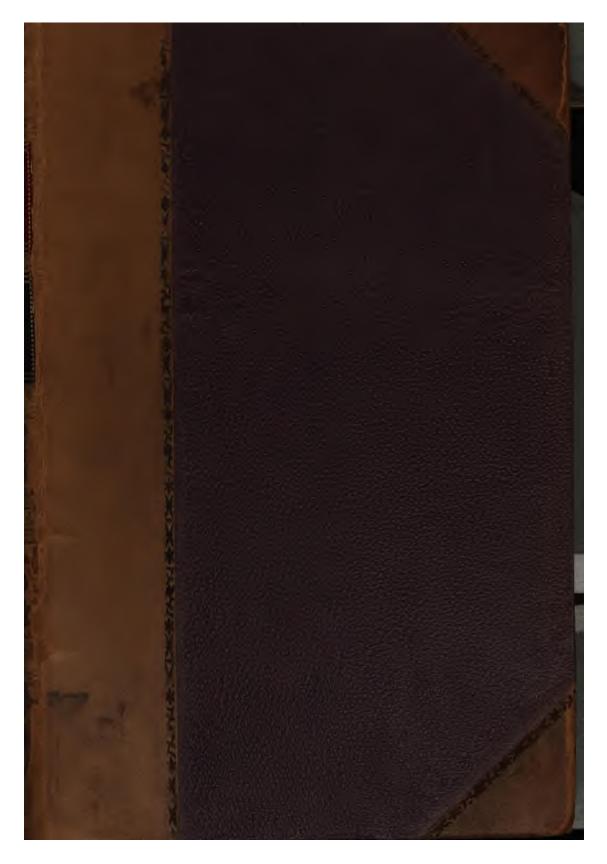
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THE PRACTITIONER:

A JOURNAL

OF

THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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THE PRACTITIONER.

JULY 1874.

Original Communications.

ACNE ROSACEA.

BY W. B. CHEADLE, M.D., F.R.C.P.

Senior Assistant Physician and Assistant to the Department for Diseases of the Skin, and Lecturer on Pathology, St. Mary's Hospital.

THIS affection of the skin possesses a greater interest than many others of a severer kind, since it exhibits on the surface of the body and enables us to observe in process of actual development during life, a series of morbid changes which we know to occur in more important internal organs, but which we can study there only after death. And the treatment of the disease is also deserving of some attention, since that which I have found most successful is not the mere empiricism with which we usually have to be content, but is founded upon definite physiological considerations. The means which do good in this eruption are exactly those means which physiology would suggest ought to do good, if the views entertained with regard to its pathology are correct.

The name "acne rosacea" is a misleading one. The disease is not acne in the true sense at all. Acne is the term applied to those eruptions of the skin which have their origin in morbid conditions of the sebaceous glands. The sebaceous glands are

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primarily and chiefly affected; the morbid process in the skin commences there; they are the original centres from which all other changes in neighbouring tissues are developed. Thus in the varieties of common acne the first change consists in excessive, and perhaps altered secretion of the gland; this gives rise to distension of the gland, and plugging of the duct, and is accompanied by inflammation and pus formation in varying degrees. In acne indurata we have precisely the same condition to begin with, but the process which goes on at certain points is more intense, and is followed by more prolonged and extensive suppuration in the glands, giving rise to the pustules and tubercular elevations filled with a collection of indolent pus mixed with sebaceous matter. And so throughout the different forms of simple acne described by various authors we find a similar series of morbid changes developed from the same centre—the sebaceous gland. In syphilitic acne, again, the disease has its original seat in this same structure, spreading thence by suppuration and ulceration to neighbouring tissues.

But in acne rosacea the case is different; the sebaceous glands are not primarily affected, and in some instances are little, if at all, involved. Actual inflammation and suppuration in them are comparatively rare. A few guttæ tisaceæ or red pimples scattered over a large extent of skin, purple with dilated varicose vessels, is the picture we usually see at the commencement of the disease. And in the simplest case of all, in the very earliest stage of the eruption, we constantly find congested and dilated vessels without any visible change whatever in the sebaceous glands themselves.

I stated that acne rosacea has been usually confounded with true affections of the sebaceous glands, and the majority of writers on the subject, including Willan and Bateman, Alibert, Wilson and Tilbury Fox, have so classed it.

Hebra has, however, constantly maintained that such classification is erroneous, and has pointed out that the essential morbid changes consist not in any inflammatory process, but in a new formation of vascular and connective tissues, the changes in the sebaceous glands being secondary or accidental. This view is supported by Dr. McCall Anderson,

and it is, I think, entirely consistent with the evidence of morbid anatomy. The changes which are discovered in the tissues after death are certainly largely increased formation of connective tissue, dilated vessels, and perhaps new vessels also. The post-mortem examinations have indeed been few, the cause of this being one which applies to the post-mortem examination of all skin diseases, viz., that few of them are in themselves fatal; the patient passes from under observation, and dying afterwards of some other affection, or of old age in the ordinary course of nature, the comparatively unimportant eruption is overlooked or unregarded.

And then, again, as I think Hebra points out, in the course of severe, fatal, constitutional maladies most of the signs of cutaneous disease disappear, and in any case the appearances visible after death represent very feebly to the naked eye those observable during life. Alibert gives a case of acne rosacea, however, in which the skin was found to be red and swollen. the rosy tubercles tough and hard in the centre, and the tissues round, gorged with blood. In some which were suppurating there was a small deposit of pus. G. Simon found the thickening and enlargement of the skin to be due to the presence of perfectly developed connective tissues in abnormal quantity. Rokitansky found the tubercles to consist of homogeneous tissue resembling that of the skin, and containing no pus or secretion of any kind in their interior. Neumann, who has lately contributed so considerably to our knowledge of the morbid histology of skin diseases, does not give any minute account of the microscopic appearances observed in acne rosacea. He merely states that it is a chronic inflammation of the skin causing permanent stasis in the blood-vessels, and eventually cell infiltration and connective tissue proliferation; regarding it clearly as a general affection of the skin of the face, not a disease specially connected with the sebaceous glands.

Now these post-mortem appearances thus recorded are those met with in the advanced stages of the disease or in its extreme form, and that condition is reached through the following successive steps.

First, there is hyperæmia and distension of the vessels of the skin over a certain area of the nose and face. This is the first change observed, the only one visible in the earliest stage of the eruption, or in its mildest form, and it is obvious enough to the naked eye during life.

Secondly, in the next stage, an enlarged and varicose condition of the vessels; thickening of the skin from serous infiltration and commencing growth of connective tissue; and the appearance of rosy prominences from the congestion round the hair follicles and sebaceous glands, with increased formation of connective tissue round these structures also.

In the more advanced stage of the disease and in its extreme form, the whole skin of the parts becomes extremely thickened, and the tubercles may increase to the size of hazel-nuts; the nose may enlarge enormously in one direction or another, and become deformed and monstrous, projecting downwards over the lip, or laterally on to the cheeks, or it may be almost uniformly hypertrophied—a red, rugged, swollen mass. This increase in volume is shown by microscopic examination to be due to a more extreme development of the same changes observed in the earlier stages and less severe forms, viz., new growth of connective tissue, dilated sebaceous ducts, dilated and varicose capillaries and venules, and probably the formation of new vessels in the new fibrous tissue, such as has been shown to occur in the new fibrous tissue of the liver in cirrhosis.

Such are the morbid changes which take place in the skin in acne rosacea. The conditions generally, and I think correctly. acknowledged to be associated with the production of acne rosacea are, excessive indulgence in alcoholic drinks, gastrio disorder, uterine disorder, and prolonged or frequent exposure of the face to heat or cold. But why these causes produce the particular effects observed, why the alcoholic excess, or gastric or uterine disorders, or exposure of the face to heat or cold should produce dilated vessels and increased growth of connective tissue in the skin of the face, has not, as far as I know been clearly explained—the links in the series of morbid changes developed from these causes have not been traced out. deficiency I shall endeavour to supply. If we look at the conditions which give rise to the vascular dilatation and fibroid thickening of the skin found in acne rosacea, we see at once

that they are all such as would induce directly or indirectly frequent or long-continued congestion of the part, either active or passive. The circulation of the face is extremely sensitive and excitable, and easily affected by various agencies both external and internal. Thus, of the causes which act directly, prolonged exposure to heat or cold (these seldom produce any but the slighter forms of the disease), the effects of the former may be seen in the case of cooks, the latter in the case of cabmen and coachmen, who are especially liable to the eruption, although in these cases the influence of the direct stimulus is frequently intensified and obscured by the action of the indirect agent alcohol. Heat acts as a direct stimulus, as we well know by common experience, and causes an active hyperæmia, with relaxation of the vascular walls and dilatation of the vessels, &c. Cold, on the other hand, appears to produce paralysis of the coats of the superficial vessels, while it causes contraction of the supplying arterioles: the superficial vessels therefore become distended with venous blood in a state of passive venous congestion. In prolonged exposure to extreme cold, as is seen in some cases of frost-bite, the muscular coats of the superficial capillaries and venules appear to have their contractility altogether destroyed, and to remain permanently dilated, and the skin in a state of constant and persistent passive venous congestion.

Then with regard to the causes which act indirectly, viz., wine or spirit drinking, and gastric or uterine irritation. It has been shown by experiment that the vaso-motor nerves of a part can be called into action so as to cause contraction of the vessels of that part by reflex action. And there seems to be little doubt that the converse of this state may be induced, and dilatation of the vessels of a part produced by reflex action also. At any rate, we know that a draught of wine or the taking of food into the stomach will frequently cause flushing of the face, and it would seem as if the influence exerted on the nerves of the gastric mucous membrane by the alcohol or food causing increased flow of blood there, is reflected to the nerves of the face so as to produce a similar increased flow of blood there also: and the irritation produced by dyspepsia and by uterine disorder appears to act in the

same way and by similar agency upon the superficial circulation of the face, which possesses great excitability, and is easily acted upon by various external and internal agencies.

In all these conditions, then, we have congestion of the vessels of the face, either active or passive, and this, which may be transitory at first, becomes after a time persistent: the frequently-repeated dose of alcohol, the constant gastric or uterine irritation, or prolonged action of heat and cold, causing repeated protracted distension of the vessels, results at last in their permanent dilatation. They become varicose, and the part permanently passively hyperæmic.

As a direct consequence of this persistent hyperæmia follows the other chief morbid change, viz., increased formation of connective tissue. We know that long-continued mechanical congestion of an organ produces induration of its substance, and Sir W. Jenner, who first drew attention to this fact, explains this result as dependent upon increased interstitial exudation of lymph which becomes organised into fibrous The blood cannot pass out of the capillaries as rapidly as it is pumped in through the arteries, there is increased pressure, and increased oozing of lymph through the capillary The lymph so effused is either converted into fibrous tissue, or the connective tissue already existing is stimulated by the excessive supply of pabulum to excessive growth. whichever explanation we accept, the fact remains that increased formation of connective tissue follows prolonged mechanical venous congestion.

We see this constantly in the lungs, the liver, the kidneys, the spleen in valvular disease of the heart. It is a special cirrhosis induced by mechanical congestion.

But I think Sir W. Jenner's proposition might be extended so as to include not merely mechanical congestion, but prolonged congestion of any kind from any cause whatever. There are many examples in which prolonged hyperæmia, induced, not mechanically, but by the action of some local irritant or other cause, is followed by connective tissue hyperplasia, as in genuine cirrhosis of the liver, fibroid thickening of the stomach in spirit-drinkers, fibroid degeneration of the kidney in chronic Bright's disease, and in many so-called chronic inflammations.

And it seems reasonable to suppose that results would follow if the congestion were produced by reflex action. The essential factor in the causation of fibroid growth appears to be prolonged, habitual engargement of the vessels of the part, and increased pressure in the capillaries. How this is brought about cannot matter, the result will be the same, viz., increased transudation through the vascular walls, and increased connective tissue growth.

This condition of continued hyperæmia exists in acne rosacea, and is followed, as in other instances, by connective tissue growth. The sebaceous glands which open into the hair follicles, lying close to the most vascular region, and always ready to take on inflammatory action, are occasionally excited to it by the surrounding congestion so as to enter upon suppuration. As a rule, however, they merely appear with the hair follicle, as thickened, red prominences.

The view that the essence of the disease lies in the general vascular changes and growth of connective tissue, and not in any inflammation or other affection of the sebaceous glands, is supported by the results of treatment.

If the disease were a true inflammation we should expect that astringents and refrigerants applied locally would do good; but this is not so. The disease can be largely benefited by treatment, but not in the way which at first sight might appear probable. The only applications which as far as my experience goes do any good in acne rosacea are *stimulating* applications—lotions of the perchloride of mercury, of sulphur, or both, applications of the acid nitrate of mercury: and these act, no doubt, by exciting the weakened, overstrained walls of the vessels to contract—brace them up to close upon their contents and resume their normal calibre.

And consistently with this, again, the internal remedies which do good are those which relieve the distension of vessels for a time—saline purgatives. It seems as if frequently drawing off a little fluid from the blood by this means, although such fluid must be rapidly replaced by absorption, by thus temporarily easing the intravascular strain, gives the vessels a chance of contracting, and aids their return in some degree towards the normal condition.

Arguing from the pathology of the eruption and the good effects observed to be produced by local stimulants, that the power of electrical stimuli in exciting prolonged contraction of the small vessels, as observed by Mr. Wharton Jones, ought to be of service in this disease. I was led to try faradisation of the surface of the skin. By the kind assistance of Mr. Knott, the Registrar at St. Mary's Hospital, I have been able to use it in four cases of moderate severity. A current of medium intensity was applied for about ten minutes twice a week, the negative pole being passed slowly over the whole of the affected surface. The first effect was to cause a bright redness of the part operated on, and increased sensation of burning. The latter passed off, however, in the course of an hour or so, and the patients declared that the uncomfortable heat of face was greatly less during the following day than it had been previous to faradisation. Although the general flushing of the face was temporarily increased, it was observed that the varicose and dilated vessels which marbled the face, and which were in one case carefully examined with a lens before and after faradisation, on three occasions were notably contracted by it. Many which were very conspicuous to the naked eye before the operation, were comparatively indistinct and obviously reduced in calibre immediately afterwards. At the next visit there was unquestionably an appreciable improvement, the colour of the face being less bright, and the gutta paler and less distinct.

In three of the cases the eruption had so far faded after treatment by this method for from two to three months that the patients professed themselves sufficiently cured, and ceased to attend. The fourth case is still under observation; the patient has repeatedly appeared almost well, and has then ceased to attend for a time, returning with a relapse in the course of a few weeks, and always improving steadily on the regular application of the remedy. These cases are too few to build upon with certainty, but the results have been sufficiently striking and satisfactory to induce a further trial of faradisation in the treatment of acne rosacea.

ON THE DEEP INJECTION OF CHLOROFORM FOR THE RELIEF OF TIC DOULOUREUX.

BY ROBERTS BARTHOLOW, M.A., M.D.,

Professor of the Practice of Medicine and of Clinical Medicine in the Medical
College of Ohio, &c.

In the *Clinic* (Cincinnati) I published last year an account of three cases of tic douloureux, two of which, certainly, had been remarkably alleviated by the deep injection of chloroform. Another case treated in the same way has been in my charge since the publication of that memoir, and two cases of very great interest have since been reported from distant parts of the United States. Although I cannot claim for this new therapeutical expedient that it is uniformly successful, yet the great relief which it has afforded in several instances justifies me in regarding it as a useful addition to our resources.

By "the deep injection of chloroform" is meant the insertion of the needle of the hypodermic syringe deeply into the tissues, and the injection of the chloroform into the neighbourhood of the nerve trunk, the peripheral distribution of which is the seat of the pain. In the cases which have been reported, the infra-orbital branch of the nerve has been the seat of the tic. In these cases the operation consists in passing the needle under the upper lip in the direction of and near to the infra-orbital foramen, and then injecting from ten to twenty minims of pure chloroform. Very considerable pain is experienced at the moment of the injection, and for a few minutes subsequently, but this presently subsides and is succeeded by a feeling of numbness and of anæsthesia of the parts into which the chloroform diffuses. A puffy swelling quickly

forms at the site of the injection, and an induration, which remains for several days, follows. The numbness of the lip and cheek continues for a variable period—for a week or more. Systemic sensations, such as giddiness and sopor, due to the diffusion of the chloroform into the blood, are soon experienced, but these effects may be scarcely perceptible, and are never alarming. Indeed, the results, so far as systemic effects are concerned, may be regarded as absolutely free from danger. So much swelling and induration occurring at the site of the injection, must occasion apprehension of the formation of an abscess. Although it would be rash to deny the probability of such an untoward occurrence, yet this accident has not thus far happened in any of the reported cases of the deep injection of chloroform.

In order to ascertain more satisfactorily than I could from an examination of the patients, the degree of suffering which attends the injection and the extent and duration of the resulting numbness, I practised an experiment on myself, by inserting fifteen minims of Squibb's chloroform under the skin of the calf of the leg. The pain was by no means so severe as I had anticipated, and indeed could easily be borne. siderable swelling resulted, and an induration as large as a filbert continued for two weeks, when it disappeared without suppuration. Immediately after the injection numbness was experienced about the site of the injection, but it then extended downwards, and on the following day had reached to the bottom A space in which the sense of touch and the appreciation of temperature and pain were markedly diminished, existed from the point at which the chloroform was inserted to the hollow of the foot, although somewhat irregular in shape, at least two inches in transverse diameter at any point. numbness and insensibility continued for three months, and could then be ascertained to exist by directing the attention to the part.

It is obvious that chloroform injected into a part modifies the power of the nerves to conduct impressions to the sensorium. When it is injected into the deeper parts of the face, it comes into relation to vessels having an intimate connection with the intracranial circulation. As is, of course, perfectly well

known, the facial vein communicates with the pterygoid plexus and the cavernous sinus. In addition to the local benumbing effect, chloroform injected for the relief of tic douloureux must quickly act on the centres of conscious impressions. As pain means—in the ordinary cases of neuralgia of the fifth, at least—an irritation of the nerve trunk, the perception by consciousness of this impression, and its reference outwardly to the peripheral distribution, we may assume that chloroform causes an interference or interruption at several points in the circuit. Not to occupy space further in these speculations, however, I give briefly some details of the cases treated by the injections of chloroform.¹

CASE I.—Man, aged 45, book-keeper by occupation. out constitutional taint. He experienced occasional paroxysms of facial pain on the right side for six years, and had various dental operations performed, including the division of all the branches of the nerve distributed to the teeth in the right upper The paroxysms, however, increased in number and severity until, for the six months previously, they occurred every few minutes. An attempt to smile, to wash his face, or to eat, brought on horrible paroxysms of pain and convulsions A great many remedies had been used, inof the muscles. cluding the galvanic current and the hypodermic injection of morphia, but none of these had afforded any but the most temporary relief. I injected twenty minims of chloroform in the manner above described. This operation brought on a frightful paroxysm of pain, which, however, soon subsided and was suc-He experienced very considerable ceeded by complete relief. giddiness and drowsiness in a few minutes, and these sensations continued an unprecedented time, for he was not entirely free from them for two days. An induration which followed the puffy swelling continued at the site of the injection for a number of days, but finally disappeared without suppuration. He presented himself at the expiration of several weeks to say that he had been absolutely free from pain, and he had gained so much in flesh, and his countenance was so much improved in expression, that I scarcely recognised him.

¹ As my notes of these cases are not accessible, I am compelled to give them from memory, but they are correctly stated here in all essential points.

For a number of months he continued free from pain or uneasiness of any kind, but he began after this to experience intimations that he was to be visited by his old enemy. About three months ago, these forebodings were realised in an actual paroxysm (since the publication of my paper). The attack was not nearly so severe as his former ones, but lest he might experience them in their old intensity, he reported at once for treatment, and I injected five minims of chloroform. This injection gave him complete relief again, and when I last saw him, a few weeks ago, there had been no attacks, and he had had none of the warnings which he had learned to interpret as indicating the return of his pain.

CASE II.—This was a farmer aged 56, otherwise in good health. He had a history of facial pain in the right superior maxillary division of the fifth for twelve years. There had been a gradual diminution in the duration of the interval and a marked increase in the severity of the attacks. For the past year they had occurred a number of times each day. As in the case narrated above, the least motion of the face induced a paroxysm at any time, but the pain occurred spontaneously very frequently. As indicating the horrible suffering which he underwent, it will suffice to say that his family could not endure the sight of his violent sufferings and facial spasms when he attempted to eat; hence he was compelled to take his meals alone.

When I raised the lip for the purpose of inserting the chloroform, he experienced such a frightful paroxysm that I was compelled to desist, and it was only after repeated efforts that I succeeded in giving the injection. The result was fortunate. He had complete relief for some days. The pain then returning, he reported for further treatment, and another injection was administered. The relief continued much longer. In all, I believe four injections were practised, and he seems to have been permanently relieved, for months have passed without his needing further treatment.

CASE III.—This case occurred in a broken-down subject, with a history of syphilis. Intracranial lesions probably existed (exostosis?). He was a patient of my friend and colleague Prof. James T. Whittaker, M.D., who used the chloroform in-

jection at my request, having exhausted the usual remedies, including galvanism and the hypodermic injection of morphia. The first injection relieved him for three days, when a very large dose of morphia, hypodermically, gave him but an hour or two of very partial relief. The pain returned, and the chloroform injections were repeated, with, however, less relief. A great deal of swelling of the face ensued, and the patient, probably disappointed in the result, ceased attending.

CASE IV.—This case was reported from Georgia, and was similar in details to Cases I. and II. Unfortunately I cannot find in London the journal containing it, but I am able to state that the physician reporting it believed that permanent relief had been obtained.

CASE V.—This is an extremely important case reported by Dr. J. B. Mattison, of New Jersey, and to be found in the *Medical Record* of New York, May 1, 1874. I present here merely an abstract of the most necessary details.

C. D.—Trifracial neuralgia had existed for two years, when it suddenly disappeared and was succeeded by sciatica of left extremity which continued twelve years. The neuralgia then returned to its original site. "The paroxysms followed each other at intervals of four to six hours, at the beginning of the attacks" after its return to the fifth, and the duration of the intervals diminished "until they were occurring every few minutes. During the seizure the muscles of the affected side twitched convulsively, the face was distorted, and the patient, laying hold of anything within his reach, groaned aloud in the agony of his distress." The patient had also acquired the A great many remedies were used for his morphia habit. relief without avail, and "morphia subcutaneously in increased amount, reaching at one time five grains at a dose, without any benefit whatever." Dr. Mattison, proceeding in the manner I had indicated in my memoir, injected twenty minims of chloroform, with the result of producing with the greatest exactitude the effects which I had described, including "the entire subsidence of pain."

"The relief from suffering continued complete for one hour and fifty-five minutes, the sopor meanwhile being very decided, and the patient acting much as if under the influence of mode14

rate general anæsthesia. At the expiration of this time he had a slight seizure; one half hour later another, very mild; and thirty minutes after, on opening a door to get into the outer air, he experienced one of considerable severity. The drowsiness continuing he was sent to bed, and on visiting him two hours subsequently, we learned that he had passed through two paroxysms, one slight, the other somewhat severe. The numbness of the lip and cheek was marked, and the drowsiness continued. This was 5 P.M. of the 22nd, from which date until the afternoon of the 27th he remained entirely exempt from pain. Dr. Mattison had withdrawn the morphia, the use of which had been uninterrupted for six years, and instituted treatment with a view to relieve the patient of the habit.

"On the 27th the patient, in washing his face, experienced a paroxysm of trifacial pain of decided severity, which continued three minutes, but without any of the spasmodic muscular movements attending the previous attack. Two hours later he had another seizure, of diminished severity, since when until the date of this communication, a period of nearly four weeks, he has been entirely free from suffering."

The doctor, in concluding his report, says: "I may add, the man has had no return of his tic; his reformation as to the opium habit seems complete, not having had an atom of morphia since the chloroform injection. He has been entirely exempt for weeks (something unprecedented during fifteen years' experience) from his sciatic trouble, making in all a very interesting case, with an eminently satisfactory result."

Although the encomiums (which I do not quote) bestowed by Dr. Mattison on the method of deep injection of chloroform may not be entirely just, it must be conceded that any remedy which relieves, even for a time, so intractable and horrible a disorder as tic douloureux, is certainly a very desirable addition to our medical armamentarium. That a permanent cure of tic douloureux can be wrought by this means of treatment, or that a case dependent on intracranial lesion can be relieved for any considerable period, it would be extremely rash to assert in either case.

BRUNSWICK HOTEL, JERMYN STREET, W.

FINAL EXPERIMENTS ON THE ELIMINATION OF ALCOHOL FROM THE BODY.

BY DR. ANSTIE.

In the autumn of 1873 I performed certain experiments, with the valued assistance of Dr. Dupré, which were intended, if possible, to finally decide the question whether alcohol to any appreciable extent escapes unchanged from the body of an animal which has ingested it. I propose now to relate these experiments, because they appear to me to complete the chain of evidence upon this question, and to render further discussion of it unnecessary. Before doing so, however, it will be necessary very briefly to remind the reader of the steps which had been already taken by Dr. Dupré and myself towards the settlement of this disputed question.

A. As regards the urine, it has now for some time past been completely settled that no substantial portion of any dose of alcohol that may have been ingested ever escapes unchanged by this channel, except in profound alcoholic narcosis.

It is needless to repeat the more incomplete researches on this subject which I made during the years immediately following the appearance of M. Lallemand's work in 1860: it is enough to say that they were at any rate sufficiently numerous and careful to prove that, except in conditions of profound alcoholic intoxication, there was (instead of the copious urinary elimination of unchanged alcohol predicated by the French observers) only the most minutely fractional appearance in the urine of any substance which even the comprehensive chromic acid test would lead one to believe might be alcohol. In 1866

came the important researches of Schulinus which pronounced generally against the elimination of alcohol in an unchanged form; and Drs. Dupré and Thudichum arrived at a similar conclusion.

Beginning with the year 1867, however, a number of investigations were instituted by Dr. Dupré and myself, which carried the question of elimination, as regards the urine, to a higher certainty of conclusion. In the first place he established the fact 1 that it was possible to recover from the urine, by distillation, any alcohol that it might contain within an exceedingly minute fraction; a very important point, because Lallemand had taken the liberty to assume that in any distillation-process applied to an animal fluid, the alcohol which the latter might contain must necessarily be largely wasted and escape estimation. Up to this time we were working with the test afforded by solution of chromic acid, and had succeeded in establishing a colour scale (of the change from red-brown to green) which enabled us to estimate with fair accuracy the proportion of alcohol in any distillate which we might obtain. But there were many objections to this kind of test, not the least being the certainty that various other deoxidising agents (besides alcohol) might produce the colour-change in the chromic acid solution. However, this at least was certain, that the chromic acid would reveal all the alcohol that was present in any distillate from urine; and accordingly, while Dr. Dupré was searching for a convenient method of excluding non-alcoholic bodies, I determined to go on with the use of the chromic acid as a reliable maximum indication. Accordingly, during six months of 1867 (March to September, inclusive), I collected and mixed the whole of my own urine daily with very few omissions, and daily submitted a sample to distillation, after the manner described in my lectures at the Royal College of Physicians.2

Every morning, with regularity, the amount of alcohol present in the twenty-four hours' water was estimated by me according to the scale of colour tests (changes in chromic acid) which had been arranged by Dr. Dupré and myself. The result of this

¹ See my lectures at the College of Physicians, Lancet, vol. ii. 1867. Also the more complete account by Dr. Dupré in the "Proceed. Royal Society," vol. xx.

² Lancet, 1867, vol. ii.

prolonged research was the establishment of the following facts:—

- 1. When, during any twenty-four hours, not more than 3iss of absolute alcohol by volume was taken—whether under the form of beer, wine, or spirit, of any kind—it was never possible to obtain evidence of the presence, in the whole day's urine, of more than a small fraction of one grain of unchanged alcohol, although I reckoned as such everything that affected the bichromate test.
- 2. When the daily quantum of ziss absolute alcohol was at all considerably exceeded, things were different. especially the case after a dinner-party: the urine passed after this always yielded a distillate which discoloured the test much more rapidly and vividly than the distillate from an ordinary day's urine. The total amount of alcohol eliminated, however, was even in these cases very small. Even when so much as Ziij or Ziv of absolute alcohol had been taken in the course of the twenty-four hours, the urine of that period never gave evidence of the presence of more than from one to two grains. In the same year (1867) Dr. Dupré, in my presence, gave Bordeaux wine to six persons, in such quantities as to produce intoxication, and the urines of all these persons were collected and mixed, and a large sample submitted to distillation, with the result that less than one per cent. of the ingested alcohol could be recovered by distillation.

The evidence so far given might have been supposed to have finished the controversy, so far as regards the possibility of the kidneys eliminating any considerable proportion of the alcohol which we take, in an unchanged form. In 1870 appeared the first series of Parkes and Wollowicz's researches on the action of alcohol upon the human body. These, in the general way, went to confirm the statements of Dupré and myself as to the small amount of alcohol-elimination by way of the kidneys: but while admitting that it was quite improbable that any large amount escaped in this direction, the authors brought forward some evidence to show that we had been mistaken in assigning the limits of the elimination-period; they thought we had made this too short, and that thus a good deal more alcohol might escape unchanged than we had imagined. As to the observa-

tions of Parkes and Wollowicz on elimination by other channels, I shall speak further on. But the objections which still appeared to keep open the possibility that a tangible proportion of alcohol might after all escape by the kidneys required to be most seriously considered, as coming from so eminent and impartial an observer as Dr. Parkes.

Accordingly, in the year 1872, Dr. Dupré answered these objections in a manner which was particularly conclusive. So far as regards the urine, he made two observations of the highest importance. No longer relying upon the colour test, he estimated the alcohol in the distillates from urines by converting it into acetic acid, by boiling with bichromate of potass and sulphuric acid, and then ascertaining the amount of acetic acid by neutralisation with a deci-normal solution of soda. Proceeding in this manner, he discovered (1) the surprising fact, that there is, in the urine of persons who do not drink alcohol at all, a small quantity of a substance which not only affects the chromic acid colour-test precisely as alcohol does, but is also capable of being similarly oxidised into an acid which is apparently identical with acetic acid, and similarly converted to iodoform by boiling with iodine and an alkali. (2.) He found that this small normal constituent of urine represents that minute portion of supposed alcohol which can alone be found in the urine after moderate doses of alcohol; and that the larger quantity of material capable of reacting on the tests which is discovered in the urine after narcotic doses, represents a certain quantity of real alcoholic elimination, over and above the other, which is not elimination of alcohol at all, at any rate not of alcohol taken into the body.

But Dr. Dupré used a further argument, drawn from his observations, which has not yet attracted the attention it deserves, but is fatal to the notion that simple elimination is the mode in which alcohol is disposed of by the organism. The same idea had previously occurred to myself. In a review ² of Parkes and Wollowicz's first alcohol-research, I assumed, for the sake of argument, that in fact as much as one-half of the ingested alcohol escaped unchanged by the various emunctories

¹ Practitioner, vol. viii. 1872.

² Ibid., vol. v. 1870, p. 104.

(doubtless a wildly improbable supposition). Even then there would have remained in the body—supposing the individual to habitually consume the by no means extravagant amount of 3ij daily of absolute alcohol, in one form or another, a daily excess of one ounce of that fluid. And as my own long-continued experiments had shown that the rate of elimination (quantities being equal) did not materially vary from day to day, it was obvious (as I said in the review) that "as an excess of ingestion over excretion goes on regularly every day, there would be an accumulation of alcohol within the body which would amount in the course of twelve months to eighteen pounds, or one-ninth" [it should have been one-seventh] "of the total bodily weight of an average male adult."

Dr. Dupré, to whom the same idea had occurred independently, proceeded to test it scientifically. So far as regarded the urine, he proved that during a course of twelve successive days, in which the total ingested alcohol amounted to 584-236 grammes¹ (more than 19 ounces), less than half a gramme (7.8 grains) of alcohol was eliminated by the kidneys: and, moreover, he showed distinctly that there was no greater elimination on the later than on the earlier days of the period during which the alcohol was being taken.

So far as the urine is concerned, it will be obvious that this finishes the controversy. Dr. Dupré has given a final demonstration of the fact that the kidneys do not, practically speaking, eliminate any alcohol at all.

It had been objected, however, both to Dr. Dupré and to myself, that we had never collected all the excretions of an alcoholised man or animal, and that therefore we had never really tested the alcohol-elimination. Besides the kidneys, there are three other possible channels of escape: the skin, the bowels, and the lungs.

B. As regards the skin, I had already made many experiments, of a somewhat rough character, no doubt, but still quite sufficient to prove that no considerable quantity of alcohol escaped that way. The plan was to take an area of skin forming a definite fraction of the total estimated superficies of the body, and to collect all the perspiration from that part (under waterproof

¹ Practitioner vol. viii. 1872.

covering) during several hours immediately following a dose of alcohol, sweating being promoted by heavy bed-clothes. Although it would have been wholly impossible to make an exact estimate in this way, still I should very quickly have discovered any large amount of alcohol escape: but, on the contrary, it was evidently quite trifling. It is only in the profound narcosis of "deaddrunkenness" that the skin gives off any quantity of alcohol that can be readily discovered by tests.

- C. As regards the bowels, it is needless to say that the examination of fæces is a task so disgusting as to throw great difficulties in the way of determining exactly the amount of alcohol which escapes by this channel. And hence the advocates of the elimination theory had, for a long time, the advantage of throwing this defect of the research in the faces of their opponents. In 1866, however, Dr. Dupré estimated for me the alcohol in the fæces of a typhus patient whose daily allowance of brandy (in health he was almost a teetotaller) was six ounces; the eliminated alcohol proved to be less than $\frac{1}{10}$ grain in twenty-four hours.
- D. The lungs are naturally thought of as a probable channel for extensive elimination of alcohol. However, I had repeatedly convinced myself that elimination by this channel is altogether trivial in amount, and is finished in a very short time. In the 1872 research, Dr. Dupré very carefully collected his own breath, on various occasions after taking alcohol: the process adopted was proved, by careful check experiments, to be capable of indicating at least two-thirds of the alcohol which might pass out with the breath. The result was, that (during the twelve days already mentioned) about half as much alcohol was eliminated in the breath as in the urine, viz., about $3\frac{1}{2}$ grains, as against 19 ounces swallowed.

In the same year (1872), however, there was published the research of Victor Subbotin,² in which rabbits were the subjects of experiment; and as they were enclosed in a Petten-kofer's chamber, it was possible for the whole of the excretions—breath, urine, dung, and sweat—to be collected, and the total alcohol passing out of the animal to be estimated.

¹ Practitioner, vol. viii. p. 151.

² Zeitschrift für Biologie, 1872.

In truth, however, these experiments of Subbotin might have been summarily rejected as wholly without value as regards the question whether ordinary (or even rather large) doses of alcohol provoke true elimination. The rabbit is an animal specially incapable of withstanding severe alcoholic narcotism, and the doses given were so enormous that the condition of the rabbits could resemble nothing but the comatose dead-drunkenness which one sees in patients who from time to time are brought to the hospital on a stretcher. As, however, M. Subbotin appeared to have found rather large quantities of excreted alcohol, and as he had adopted the very desirable method of enclosing the animals in a Pettenkofer's chamber, it appeared proper to repeat our experiments with this modification.

It need not be said that we would, if possible, have performed these new experiments on men; but unfortunately there does not exist, in London, a Pettenkofer's chamber of the requisite size for researches on human beings, and as to put up one for ourselves would have cost £800, we were obliged to content ourselves with observations on smaller animals; and dogs were selected, as being known to bear alcohol with some approach to the human tolerance for that substance.

Accordingly, in July 1873, two healthy terrier dogs were procured, one (A) weighing 10lbs., the other (B) weighing 9 lbs. 12 oz.

The apparatus employed must now be described. A zinc box was prepared, fitted with a lid which sank into a putty joint, quite air-tight. At one end of the box was an opening fitted with a valve opening inwards to admit a current of air; at the other end was an opening connected with a steam exhaustion-apparatus, or aspirator. It was found that by these means about 12 cubic feet of air per hour were drawn through the chamber. The current of mixed steam and air was made to pass through two condensers successively; the first was cooled by water at the ordinary temperature, the second by iced water. In these condensers almost all the steam and the greater part of any alcohol present must be condensed. In the distillate obtained, amounting to about three pints in the course of four

hours, the alcohol was estimated by repeated distillation and oxidation to acetic acid, as previously described.¹

CONTROL EXPERIMENTS.

Everything being arranged as usual, but no animal being in the box, the current of air, previous to entering the chamber, was passed over a measured quantity of very diluted spirit (2 per cent.) which was thus gradually evaporated; the rate of evaporation was so timed that the process occupied, as nearly as possible, four hours. The air thus charged with alcohol had to pass through the entire apparatus, and the alcohol was estimated in the distillate in the manner already described. Two such experiments were conducted:—

		Taken up.	Rec	overed as Acetic Acid.
1st Experiment		1.27 grains	÷	0.89 grains.
2nd		2.54 ,,		1.89 "

About three-fourths of the alcohol evaporated, therefore, is recovered from the distillate.

DIRECT EXPERIMENTS.

Dog A (weight 10 lbs.)—On July 22 this dog was placed in the box for four hours; the distillates from mixed steam and air were collected, and the distillate of the urine passed during four hours was added. The combined fluid neutralised 0.3 c.c. deci-normal solution of soda, equivalent to 0.021 grain, or (adding one-third for loss, as shown by control experiments) 0.028 grains of matter oxidisable to acetic acid.

July 23, at 8.45 A.M., 3ij brandy, containing 47.73 grains of absolute alcohol, were given to the dog, which was then placed in the box at 9 A.M. and kept there till 1 P.M. Acetic acid obtained from distillate, including urine, neutralised 1.35 c.c. deci-normal soda solution, equivalent to 0.096 grain absolute alcohol, or (adding one-third for loss) 0.128 grain.

For the fullest account of this process, see "Proceedings Royal Society," vol. xx. p. 268.

At 5 P.M. the dog was again put into the box and kept in till 9 P.M. Acetic acid obtained from distillates, including urine, neutralised 0·1 c.c. deci-normal soda solution, equivalent to 0·0071 grain absolute alcohol. This amount is only one-third of that obtained in an equal period previous to any brandy being given, and it is therefore seen that elimination must have been already completed at the end of the eighth hour from administration of the dose. Taking, then, the amount of alcohol eliminated between four hours and eight hours after the dose at one half of that eliminated during the first period of four hours, or 0·064 grain absolute alcohol, we arrive at the conclusion that the total elimination after a dose of 47·73 grains of absolute alcohol amounted to 0·192 grain of absolute alcohol.

July 24, the same animal was confined in the box from 11 A.M. to 3 P.M. Acetic acid obtained (urine included) neutralised 0.3 c.c. of the deci-normal solution of soda, which result is precisely the same as was obtained in the first experiment, before the dog had taken any brandy, and must therefore be taken to represent the normal elimination, by this animal, of substances capable of being oxidised to acetic acid.

Dog B (weight 9 lbs. 12 oz.)—From July 12 (7 A.M.) to July 22 (7 A.M.) this animal was given 1 oz. daily of brandy, containing 190.92 grains absolute alcohol; the daily quantum was administered in two portions.

July 22, 11.30 A.M., the dog was put into the box and kept there until 3.45 P.M. Owing perhaps to the intense heat of the weather and the small amount of drink given to the dog, no appreciable quantity of urine was passed during this time. Acetic acid obtained from distillates neutralised 2.1 c.c. decinormal solution of soda, equivalent to 0.15 grain of absolute alcohol, or (adding one-third for loss) 0.21 grain, which, calculated in twenty-four hours, would give 1.13 grains absolute alcohol as a whole day's elimination.

July 23, the dog, having had its usual 3ss. of brandy at 7 A.M., was killed at 9 A.M. It is important to note the exact steps of the killing and the subsequent processes.

The dog was placed in a very large basin in a spacious, cool room. I then pithed him with a long and narrow knife, death

being nearly instantaneous. The blood which then and at further stages escaped was carefully caught up into sponges and plunged into a large stone jar already containing 8 pints of With a very active assistant helping me, I distilled water. then proceeded, with the utmost rapidity, to skin and cut the animal into minute fragments, none of them more than about one inch long, every bone being cracked open, and every individual fragment, as it was cut from the body, being instantly plunged into the water. In about thirty minutes every fragment of the dog's body and all its solid and fluid contents were plunged into the water. The jar was then securely closed, and the mixture frequently agitated until 11 A.M., when one pint of the now thoroughly mixed mass was distilled, and the alcohol estimated in the usual way. The acetic acid obtained neutralised 23.9 c.c. deci-normal solution of soda, equivalent to 1.69 grains absolute alcohol. If we multiply this by 14 (as there were about 14 pints total fluid) we get 23.66 grains of absolute alcohol as the product of the dog's whole body and all its contents. It must be remembered, moreover, that this figure ought probably to be much reduced, as it really stands for the whole of the substances in the body which were capable on oxidation of yielding acetic acid. From Dr. Dupré's previous researches it would seem probable that the amount of such substances, not being ingested alcohol, was considerable. taking the whole as ingested alcohol, 23.66 grains is of course a perfectly trivial residuum to be found in the animal's body after ten days' daily allowance of 190.92 grains absolute alcohol, of which 95.46 grains had been taken not two hours before death. Add to this the fact that the total alcohol eliminated on the tenth day of brandy diet was only 1:13 grains absolute alcohol, and it must, I think, be plain to any candid reader that the dog did, on each day, dispose by other means than by elimination of very nearly the whole of his potion of 190.92 grains absolute alcohol.

The evidence, indeed, which is afforded by those experiments on dogs appears to me overwhelming; and even did it stand quite alone, I do not see how its force could be evaded. The experiments on the dog A show that 47.73 grains of alcohol can be disposed of by a little terrier within eight hours

with only the elimination of one-fifth of a grain of unchanged alcohol by all channels together. The experiments on the dog Bshow that a terrier of less than 10 lbs. weight could take with comparative impunity nearly 2,000 grains of absolute alcohol in ten days; that on the last day of the regimen he only eliminated by all channels) 1.13 grains of alcohol; and that on his being killed (two hours after swallowing 95.1 grains of absolute alcohol) only 23.66 grains were recovered from his whole body and all its contents, elaborately treated so as to provide against material loss during the examination. These experiments certainly furnish us with final and conclusive demonstration, as regards dogs, of the correctness of Dr. Dupré's arguments against the possibility of material accumulation of alcohol in the body. Had such accumulation occurred, nothing could possibly have prevented its becoming apparent on analysis of the body of the dog who had been brandy-drinking to such a large extent for ten days together. Remember that the daily portion of this animal was equivalent (reckoning in proportion to weight) to 14 ounces of brandy per diem for an adult man of average growth.

In the year 1872, Dr. Parkes ² observed: "With regard to the destruction of alcohol in the body, I admit at once that the experiments of Schulinus, yourself, and Dupré have rendered it very probable. I do not think we can say it is *proved*, in the scientific sense of the word, until the quantitative determination of the amount of exit from the skin and lungs is far more complete."

I think I may fairly appeal now to Dr. Parkes to say whether Dupré's investigation (immediately afterwards) in 1872, and our conjoint researches in 1873, have not filled up the gap which existed between high probability and proof. I should indeed be very glad, if the opportunity were to present itself, to try the process with a Pettenkofer's chamber upon a human being; but I cannot now for a moment doubt what the result would be. It would of course be improper to argue from the case of dogs to that of men, were the known phenomena in the latter in any way opposed to those now obtained in the case of dogs. But the truth is, that the elimination of alcohol by the skin and lungs in man (in any but the most trivial quantities) was

¹ The dog did get somewhat out of health before the end of the experiment.

² Practitioner, vol. viii.

brought indefinitely near to absolute disproof by the earlier researches of Dupré and myself. For the kidney elimination being proved to be practically nil, what one had to imagine was, a possible discharge of as much as 800 or 900 grains of absolute alcohol per diem by skin and lungs (with perhaps some very slight assistance from the bowels) in the case of quite sober and ordinary drinkers. Such a discharge, I need not say, would make itself most readily obvious to chemical tests, if not, indeed, to the sense of smell. On the contrary, we had been continually baffled in our attempts to collect any but the most fractional quantities of alcohol from either sweat or breath.

I therefore trust that we may now consider one important portion of the alcohol question to be closed. It is certainly rather hard that the very inadequate researches of Lallemand, Duroy, and Perrin should have been allowed so long to mislead the majority of the profession and of the public upon the subject of the elimination of alcohol, being, as they were, mere qualitative experiments, and, even as such, devised and carried out with such an absence of all reasonable precaution against fallacy as should have set physiologists on their guard at once. is, it has cost some fourteen years of almost unintermittent work to explode the errors which the French observers made current respecting a merely preliminary investigation into the action of alcohol. I appeal to the respectable members of the teetotal party, and I put it to their sense of honour not to continue to circulate the gross misstatements on this subject which even now are circulated broadcast in the tracts with which their Society floods the country. It cannot do the temperance cause any good in the end; indeed, the discovery that they have been systematically misled on a point to which their informers could have no difficulty in ascertaining the truth, has already produced a strong revulsion in the minds of many persons against everything that bears the most distant relation to teetotalism.

If, then, the subject of elimination of unchanged alcohol may now, as I presume, be considered as closed, we can see our way to the discussion of other very important questions respecting the physiological rôle of alcohol. Dr. Parkes, in a continuation of the passage which I quoted just now, intimated that in the event of alcohol being proved to be destroyed in the body, it

would be especially necessary, before coming to any decision as to its physiological value, to make out clearly the nature of its influence upon the elimination of carbon from the body. That is a task which Dr. Dupré and myself have already commenced (by a number of analyses of the breath, for carbonic acid), and the further prosecution of which will be the first use to which the new physiological laboratory of Westminster Hospital will So far we have had to content ourselves with a larger and generally improved box (as a Pettenkofer's chamber) and which answers the purpose admirably well, and a driving-power obtained from the falling of an ordinary gas-holder. experiments now to be immediately resumed the driving-power will be obtained from a small steam-engine. We have so far used, and shall continue to use, the well-known plan of conducting the air issuing from the chamber through a series of tubes containing baryta water: but our experience in a series of trials which we made last Christmas has shown us the necessity of employing a more elaborate system of meters for estimating the rapidity with which the current of air passes through the Moreover, it will be desirable to test the results which have been obtained by one system of estimation, by the employment of a different plan: and of course it will be necessary to multiply experiments as much as possible. I shall therefore abstain from mentioning the results which we have so far obtained, in testing the effects of alcohol on the elimination of carbonic acid by dogs, until I can present them in conjunction with the results of a number of fresh trials.

It is impossible fully to appreciate the importance of the further inquiries which must be made respecting the action of alcohol unless we remember the actual state of physiological knowledge respecting the processes of alimentation. No physiologist of any standing at present doubts that hydrocarbons and hydrates of carbon by their consumption produce available force within the body, and, in fact, that the bulk of the work done in the organism is obtained from these substances. Alcohol, as Dr. Pavy remarks (in the interesting work which we review on another page of our present issue), stands in a peculiar position, being intermediate, as to composition, between these two classes of foods. Being, as it is, a most highly oxidisable sub-

stance, it would be strange indeed if its oxidation did not prove to be the mode by which alcohol disappears within the organism. And looking to the fact that Dr. Parkes and myself have from independent (and indeed opposite quarters) come to singularly close agreement as to the daily allowance of alcohol that can be taken without producing any narcotism or other visible disturbance in the organism, I think I may take it as conceded that quite 600 grains of absolute alcohol can be disposed of daily within the organism of an adult male without any perceptible injurious effect upon the bodily functions. Now, this quantity of alcohol is (theoretically) capable of generating an enormous amount of force: but it is equally certain that that force does not show itself under the form of heat. It is scarcely possible, therefore, but that the solution of the questions as to the action of alcohol in the body will also bring about the discovery of new physiological facts of great interest and importance:—

- 1. If alcohol be a force-producing food, as seems by far the most likely, it is probably of great value in that capacity, on account of the rapidity with which its transformations take place. It is, however, abundantly certain that beyond a certain dosage (which is pretty clearly made out for the average, though of course there are individual exceptions in both directions) it becomes a narcotic poison of a very dangerous character in every respect: not the least disadvantage being that it cannot be eliminated to any considerable extent.
- 2. If alcohol does not disappear by oxidation, it must undergo some as yet quite unknown transformation, after which it must escape unrecognised in the excretions. I have heard various attempts to suggest such modes of disappearance, but nothing, so far, which wears any air of probability.
- 3. If alcohol, however, be indeed oxidised, and yet does not beget force which can be used in the organism, this would be the strangest possible discovery. Considering the very high theoretical force value of the 600 to 800 grains of absolute alcohol which millions of sober persons are taking every day, we may well be hopeless of any reasonable answer to the question,—Why does not this large development of wholly useless force within the body produce some violent symptoms of disturbance?

Rebiews.

A Treatise on Food and Dietetics, Physiologically and Therapeutically considered. By F. W. PAVY, M.D. F.R.S., &c. &c. London: Churchill; and Simpkin and Marshall. 1874, 8vo. pp. 559.

Our natural impulse on first taking up any book so beautifully printed, with such charming paper and type, as this work of Dr. Pavy's, is to expect that the luxury of the external get-up was intended to cover deficiencies of solid merit. This would be a great mistake in the present instance, for the author has given as substantial fare as we could reasonably desire. We may at once state that this is a book of first-rate merit, and that it handles its important subject in a manner which is especially valuable to the physiologist and to the medical practitioner; while on the other hand there are large sections of it that may be read with advantage by the public. The author remarks in his brief preface: "From the fact that the subject of food is one of deep concern, both to the healthy and the sick; that the information which has been obtained during the last few years has completely revolutionised some of the cardinal scientific notions formerly entertained; and that no modern systematic treatise of the kind here presented exists in the English language, I have been encouraged to think that the task I have undertaken may not be deemed superfluous." Superfluous it certainly was not; on the contrary, we have long felt that there was scarcely anything more pressingly needed than such a book. The treatises of Dr. Letheby and of Dr. Lankester each have their merits, and Dr. Edward Smith must be mentioned with the respect due to one who undoubtedly did much to demonstrate the falsity of Liebig's views as to the source and outcome of muscular work. But neither of these authors has produced any connected work on food and dietetics which is at once so original and so full of useful information.

The sections of Dr. Pavy's book deal successively with the following topics:—The dynamic relations of food; the origination of food; the constituent elements of food; alimentary

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principles, their classification, chemical relations, digestion, assimilation and physiological uses; the alimentary substances; the preservation of food; practical dietetics; therapeutical dietetics. When we say that all these large subjects are dealt with in a thoroughly efficient manner, it will be at once understood that the author must have expended much research and thought, and that his work is one that for years to come will probably stand for the class-book, in the best sense, of alimentary science. As an example of the great pains which he has taken to do his work thoroughly, we may mention that in the 47 pages which he gives to practical dietetics he gives a summary of all the principal and striking varieties of diet which are to be found among widely separated nations and races, and winds up the section with some practical conclusions which are of great value as coming from one who has so thoroughly considered the sub-The particular value of mixed diets, the subject of vegetarianism (on which he writes with great moderation and sense); the frequent over-estimation of the value of a meat diet; the comparison of the effects of animal and of vegetable foods; the proper amount of food; the effects of excessive and of deficient food; the proper times for eating; and, finally, the processes of cookery (to which he devotes several pages of very careful writing); all these matters are put before us in a practical manner, which will be equally valuable to the physician and to mistresses of households who will take the pains to study them carefully.

It is impossible, in the moderate space which this journal can afford for review-purposes, to do more than notice the salient points of a large work like Dr. Pavy's. There are certain matters which he treats with a thoroughness, yet novelty, which make us

particularly anxious to draw attention to them.

Of paramount importance and interest just now is the question -what is the true value of nitrogen-containing food supplies? That they must in some measure be required for tissue-building is, of course, obvious, more particularly in the young growing subject. But in what way are we to look at nitrogenised foods as contributing to force-production, now that we are aware that muscular force is not derived from the destruction of muscular tissues? Does urea, for example, represent the outcome of nitrogenised food which has been through a process which developed force applicable to vital purposes? Yes, says Dr. Pavy; but the urea itself is pure waste, and it includes nearly all the ingoing albumen of the food. His explanation is the following:— The nitrogen of albumen is about 15.5 per cent., and in passing out of the system carries with it certain proportions also of carbon, hydrogen, and nitrogen, which go to make up urea. There remains from the destruction of albumen about 66.80 per cent. of its original weight, containing 46.86 carbon, 4.79

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hydrogen, and 13·15 oxygen, besides sulphur and phosphorus for utilisation and exit in another way. Urea is the inutilisable portion of the albuminous principle, but "whether it is formed as a primary product of the splitting up of albumen—that is, whether the elements at once group themselves from the albuminous compound into the combination representing it—or whether it forms the final product of a series of changes, cannot be stated." In the next paragraph to this, Dr. Pavy puts forward what may be called an argument from final causes, when he suggests that urea, which is known to be so closely allied to carbonate of ammonia, is an alternative form of the latter (one of the normal last products of organic decomposition) designed for the safety of the organism. Urea can pass out of the body without doing harm. Carbonate of ammonia developed in large quantities would be so powerfully irritant as to seriously endanger life.

The final conclusion to which Pavy comes as to the position of albumen as a force-producer will interest our readers. He calculates that albumen has about half the value of fat, and a greater value than either starch or sugar, as a source of force. He puts aside as needlessly visionary Liebig's latest theory (developed under the pressure of circumstances which had compelled the latter to confess that urea is not found in the muscular tissues), that there is some hidden source of force stored up in nitrogenised compounds, just as alcohol gives out in combustion more heat than its corresponding amount of sugar, though some force has been already evolved in the process of fermentation.

A variety of more or less important consequences flow from the position which Dr. Pavy (in substantial agreement with the majority of recent physiologists) assigns to nitrogenised foods. Among the most striking of these (which has for some time past become manifest) is the exaggerated value which common opinion attaches to animal food as a main article of diet. Dr. Pavy, though no vegetarian, argues strongly on this point, and on the whole we agree with him. Animal flesh, so far as it has any special (physiological) claim to be admitted into our diet. has for a long time seemed to us to be chiefly recommendable on the score of its felicitous blending of a small amount of nitrogen with a great deal of fat. On all sides the oleaginous constituents of food are acquiring daily a higher recognised value; and a vegetarian who would take care to include a proper amount of these in his menu would have much to say for him-But we would remark here, that Dr. Pavy, no more than any other physiologist whom we have studied, makes any clear or precise estimate of one important matter, viz., the difference between the ages of growth and those of stationariness and decline, as regards the necessity for nitrogenous food-supplies. He does,

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however, make some forcible remarks on the necessity of frequent

food-supplies for children.

In relation to the rôle of alcohol within the organism, we are glad to observe that Pavy admits, what we have so long contended for, that probabilities (according to the most recent discoveries in physiology) are on the whole in favour of the belief that alcohol is utilised as a force-producing food. Upon one point we are glad to have an opportunity of correcting an apparent misconception. He appears to reckon Anstie among those who believe that alcohol develops sensible heat and raises the temperature of the body. The experiments which he quotes (elevation of temperature in the ears of alcoholised animals) have long been recognised by Anstie as merely affording an instance of altered distribution of heat, owing to vaso-motor paralysis.

On the whole, it would seem as if we were coming very near to the old Hebrew ideal of a plenteous and nourishing diet. "Corn," if we may include a few other vegetables with it, "wine, and oil" seem to make up a very natural and very efficient diet. Flesh-feeding is mainly an affair of economy of bulk, and, by suitable devices, may be largely dispensed

with.

Here we are obliged abruptly to stop; just as we seemed to have begun our remarks on this interesting book. After all, it is of little consequence; for everyone should possess the work and its merits will not be difficult to recognise. No doubt is has some defects, and is far from being absolutely complete. There are here and there some hastily written sentences in which we detected a superfluous word or a want of strictly grammation construction, but these are rare, and on the whole the book well and very intelligibly written. It is at any rate the best wor in English, on its subject, and deserves the close attention all classes of society as well as of the medical profession.

Practical Medicine, with a sketch of Physiology and Therapeutic—Being the fourth edition of Meade's Manual for Students. B. ALEXANDER SILVER, M.A., M.D., Physician to Charing Cros. Hospital, &c. &c. Henry Renshaw: 1874.

WE are glad of an opportunity to say a few words of appreciation of this volume, which has been dealt with, in one or two instances, not merely harshly but with distinct injustice by critics. We do not think that Meade's Manual was a very good type to work upon: and therein we consider the author has been unfortunate. But there are many parts of the work where Dr. Silver had the opportunity to show his own accuracy of clinical observation and his strong practical good sense, and the

result is that we get a number of very interesting and useful introductory sketches of disease, and good general notions of the principles of treatment. The author would be the first, as we see from the preface, to disclaim any attempt at completeness. We could doubtless pick holes, as well as other people; but it occurs to us that the main question for the critic of this book is as to the general effect it will produce upon the student. It strikes us that its absence of pretence will save the student from the mischief which he sometimes receives from Manuals which contain more elaborate descriptions of diseases and their treatment; for the object of the book is plainly seen to be that of introducing the student to the observation of disease for himself. As a cram-book it would not answer the idle or unconscientious student's purpose.

We should be glad, however, to see Dr. Silver, who is coming to occupy an important place as a hospital-teacher, produce an entirely original work as the results of his personal observation. There is a grand field open now, in clinical teaching, and the men who are now in the prime of their vigour will do well to throw off unnecessary reserve and enter boldly and zealously in the path of original research and original teaching; for not merely our theories and our supposed facts, but also our methods of communicating knowledge, require to be largely remodelled.

Clinic of the Month.

Treatment of a certain form of Disease of the Middle Lar by Alcohol.—Dr. J. Patterson Cassells, of Glasgow, observes that to Dr. Löwenberg belongs the merit of having first recommended the local application of alcohol in certain diseases of the tympanic cavity. This he has done in an exhaustive and elaborate manner in a communication to El Pabellon Médico (Madrid, 1870), entitled "De la Otorrea." Dr. Cassells' own experience. during the last two years, with this remedy in the catarrhal and inflammatory affections of the tympanum, enables him to confirm all that he has advanced in that communication. he found it of especial value in the more advanced stages of simple catarrh, complicated with a lesion of the membrana tympani, and as he believes that in such cases it is almost specific. he proposes to describe the appearance of the tissues in this morbid condition somewhat more fully than Dr. Löwenberg has done in the paper above referred to. This he thinks is all the more necessary, as he fears that when the use of this therapeutic agent becomes more general in aural medicine, it may fall into disrepute by its indiscriminate application in cases in which its use is either contra-indicated or at least not likely to yield satisfactory results.

The affections of the tympanum, out of which all other diseases of this cavity seem to develop themselves, are simple catarrh, muco-tympanitis, and tympanitis; but, as he has already shown, the use of alcohol appears to be more efficacious in an advanced stage of the first-named disease. The following remarks apply exclusively to it.

This affection of the tympanum (simple catarrh) consists in hyper-secretion by its lining membrane, unduly stimulated to increased action through causes that determine an over-abundantion of blood to it. Under favourable circumstances this condition ends in resolution by a return of the hyperæmic tissue to its normal state, but not unfrequently it passes into one in which the morbid processes are in abeyance, and the secretion contained in the tympanum becomes inspissated. More commonly, however, and especially in early life, the morbid processes set up in this cavity become chronic, but still continue active. The

secretion increases in quantity, till, exceeding the capacity of the tympanum to contain it, and unable to effect its escape by the Eustachian tube already concentrically closed, it breaks through the membrana tympani, and appears as a flocculent discharge from the external meatus, constituting catarrhal otorrhea. If at this stage the parts are carefully freed from this secretion, we observe a greater or less loss of structure of the membrana tympani, and the lining membrane of the tympanum highly congested, the colour of it depending upon the degree of the hyperæmia and the duration of the previous stages of the disease; and that it is also hypertrophied and villous. To this condition of the membrane Dr. Cassells applies the name polypous hypertrophy, as sufficiently designatory of its appearance. What its microscopic character may be he is not at present prepared to say, for except in an indirect manner, he has not had an opportunity of ascertaining this. When polypi, however, develop themselves out of this morbid state, and have their attachment to the lining membrane of this cavity, they appear under the microscope to be made up of a proliferation of the loops or papillæ of its vascular layer covered with its own epithelium. The inference, therefore, that in this condition of the lining membrane of the tympanum there is a true hypertrophy of its normal structure, seems warranted. This condition of the ear, briefly and therefore imperfectly described above, is that in which he has found the local application of alcohol almost specific.

Those who are familiar with this speciality will not fail to recognise a similarity between the disease described by Dr. Cassells, and that in which Professor Schwartze, of Halle, recommends his excellent neutralisation treatment (see Archiv für Ohrenheilkunde). But while the method devised by the distinguished professor is not inadmissible in recent cases, it is better adapted to those very chronic forms of this disease met with in adult and advanced life. The alcohol, on the other hand, for reasons that need not be entered on, will recommend itself to the practitioner in the treatment of those cases that occur in infancy and childhood. (Lancet, April 25, 1874.)

The Liver in Jaundice.—Dr. J. Wickham Legg contributes some papers to the British Medical Journal, in which he describes the changes in the liver which follow an obstruction to the flow of bile into the duodenum. These morbid appearances divide themselves into two heads: 1. The changes met with in the bile passages; 2. Those met with in the parenchyma of the liver itself. The first effect of an obstruction in the bile-ducts is a dilatation of the duct behind the obstruction; the gall bladder, if the common duct be occluded, suffering first and

becoming filled with a dark viscid bile. If the gall bladder be distended and the cystic duct become occluded by a gall stone, for instance, the bile undergoes absorption, and its place is taken by a colourless fluid which is either viscid or limpid, constituting the hydrops vesicæ felliæ of the older writers. extent of the general dilatation of the ducts both within and without the substance of the liver depends upon the degree of the obstruction and the length of time it has lasted. In some cases the dilatation does not reach the interlobular ducts, and it is doubtful whether the capillary ducts ever become varicose. The left branches of the hepatic ducts have, in the cases Dr. Legg has examined, always been much more dilated than the right. The catarrh which is set up by long-continued obstruction sometimes goes on to suppuration of the duct, and a mixture of pus and mucus is found in the biliary canals. In another form multiple abscesses appear. In all cases of longcontinued obstruction to the bile-ducts, the connective tissue grows, the overgrowth beginning a few hours after the operation. The chief change in the liver cells is atrophy. Their contents seem to be chiefly fat and a few pigment granules; the fat is rarely in large drops. Within a few days after complete obstruction to the gall-ducts, the liver ceases to secrete glycogen. function of the secretion of the biliary acids is believed to be interfered with or abolished, but further evidence is required: The quantity of urea excreted by the kidneys has in several instances been quite normal. (British Med. Journ., May and 16.)

Causes and Treatment of Intestinal Obstruction.—In paper read before the West Kent Medico-Chirurgical Society, Mr. W. Wagstaffe stated that he founded the remarks he was about to make on a case of intestinal obstruction that had recently fallen under his notice, in which there had been total occlusion for seventeen days, with vomiting and increasing abdominal distension. The obstruction was caused by a hard tumour growing from the left sacro-iliac synchondrosis, stretching across the pelvis, and involving the anterior wall of the rectum. Some other portion of the gut was probably also involved, for the hand could be passed into the rectum (after the manner proposed by Professor Simon of Heidelberg), above the tumour, and the intestine found empty. Mr. Wagstaffe therefore opened the intestine in the right groin, and the patient had since progressed After insisting upon the importance of thorough rectal examination, and pointing out the dangers to be avoided in the manipulation, Mr. Wagstaffe examined carefully the means at our disposal for determining the locality of the disease or mechanical defect, and quoted cases which had come under his

own personal observation bearing upon the various symptoms of He next discussed the kinds of obstruction and their causes (bringing forward illustrative cases), and then dwelt upon the differential diagnosis of these. Lastly, he examined the various kinds of treatment suitable in intestinal obstruction. including gastrotomy, colotomy, enterotomy, inflation, and medicinal means. He ended by stating in the form of propositions the following observations:—1. That the symptoms of obstruction, though sometimes obscure, can generally be determined by the history of present and past illness and by thorough external and internal examination, and that manual exploration of the rectum is perhaps the greatest advance in our means of diag-2. That the locality of the disease may be generally discovered by the use of the same means of diagnosis, particular attention being paid to internal examination of the 3. That the early treatment will be the same, whatever the cause—by opium and belladonna, by rectal distension, and in the majority of cases coming early under notice, by careful external manipulation. 4. That after the failure of such simple means within a reasonable time and in the presence of general obstructive symptoms, operative measures should be adopted without delay. 5. That if the cause of obstruction be known and within reach and not removable, colotomy should be preferred. 6. That if the obstruction be beyond reach and unknown, tapping the intestine may sometimes be serviceable; that other-Wise either gastrotomy or enterotomy must be performed. That gastrotomy, by at first a limited incision for the purpose of exploring and removing mechanical obstacles, is likely to be the most beneficial operation. 8. That above all things it is most necessary to avoid delay, for conditions of strangulation, at first relievable by operation, soon become unrelievable. (Medical Times and Gazette, April 25, 1874.)

Intercostal Neuralgia in Women.—Dr. M. Fothergill remarks that this is a very well-marked form of neuralgic disease and is very common. It belongs to the reproductive period of woman's existence, is troublesome and untractable, and almost always associated with leucorrhœa, amenorrhæa, or menorrhægia; or it occurs in women who are suckling. The treatment he recommends is a combination of stimulants and tonics, especially carbonate of ammonia, with the ammonic-citrate of iron in an infusion of quassia. After a short time this may be advantageously changed for sulphate of quinine, muriate of iron, and quassia. In other cases Dr. Ferrier's plan of administering gentian and rhubarb mixture may be adopted, especially when symptoms of gastric derangement are found. Belladonna plasters and mustard plasters may also be applied over the tender parts

which usually correspond with the origin of the sixth intercostal nerve. Special attention should be paid to the leucorrhoea, and cold baths, spongings or injections ordered. Menorrhagia should receive suitable treatment, and suckling discontinued. (The Obstetrical Journal, No. 12.)

Croton-chloral in Facial Neuralgia, -Dr. Lee, of Heckmondwike, reports a case in which a patient experienced speedy relief from croton-chloral. He was consulted by a married lady, aged 32, slightly anæmic, suffering occasionally from dvspepsia, and for the last three or four years subject to severe attacks of facial neuralgia on the right side (distinctly along the branches of the trigeminus). Three weeks previously to her being seen, an attack came on. The pain was most excruciating with but little intermission, causing sleepless nights and rendering the patient almost frantic, ever since the commencement of the attack. She had been blistered, had three sound teeth extracted, and tried various other means to obtain relief, without avail. Dr. Lee prescribed three grains of croton-chloral to be taken every four hours till the pain was relieved. After the first dose a modified attack was felt; after the second a very slight attack; and after the third dose perfect ease was experienced. A fortnight after she was free from pain and had had no relapse (British Med. Journal, May 23, 1874.)

Treatment of Fracture of the Skull.—Dr. Corley, of the Jervis Street Hospital, Dublin, records a series of cases of fractures of the skull, and in his final observations enumerates the injuries of the cranial bones for the relief of which trephining has been practised, which are as follows:—

1. Simple Fissure.—For this fracture the operation should never be performed. True, that accompanying the injury there may be localised extravasation of blood; or, subsequent to and consequent on it, there may be formation of matter, which may require the application of the trephine, but the operation then has no reference to the fracture.

2. Simple Comminuted Fracture.—A fracture may be simple externally, but the inner table may be more extensively fractured, and fragments may wound the dura mater or brain. This condition cannot be guessed at until symptoms of intracranial mischief arise: for them, and not for the fracture, we may trephine

3. Depressed Fracture.—Dr. Corley does not make any distinction between simple, depressed, and compound fracture as to operative treatment. The latter is more liable to be followed by intracranial mischief. As long as no symptoms are present, or, if present, until we have tried all other means of removing them, we should not operate. If obliged to interfere, we do so

with little hope, as the symptoms are most likely to own an

origin other than the depressed bone.

4. Depressed Fracture, Comminuted, including that which is known as "punctured" fracture, such as may be produced by the stab of a pointed weapon, kick of horse, or blow of a sharp stone.—In many cases of this description it may be necessary to operate at once, whether symptoms be present or not. If the surgeon has reason to believe that in a punctured fracture spiculæ of bone are impinging on the surface of the brain and lacerating it, he is bound to interfere at once. The cause, nature, and position of the injury, and the peculiarities of the symptoms, if any be present, will all be of value in assisting him to arrive at a correct determination. However, in this case, the only one in which interference should be sanctioned without symptoms, much must be left to the experience and judgment of the surgeon. (Dublin Medical Journal, April 1874.)

Perchloride of Mercury in the Diarrhosa of Typhoid Fever.—Mr. T. L. Walford, Reading, records two cases which were submitted to the above treatment with good results in the Fever Hospital of the Reading Union. The following is one of them: On January 8, 1874, Charles W., aged 29, was admitted with typhoid fever, having been ill seven days. He had acetate of ammonia mixture and was placed on fever-diet. On the 10th he took four grains of blue pill and 11 of ipecacuanha, followed by the sulphate of potash and rhubarb draught in the morning. The bowels were cleared out, and that is all that could be said. On the 13th, no improvement having taken place in the quantity passing from the bowels, and there being hepatic fulness and tenderness on pressure, four leeches were applied, and a grain and a half of calomel with four grains of blue pill, followed by the above-mentioned draught, were given. The leech-bites bled freely, and the medicine acted well, with evident relief to the febrile symptoms, but without any impression on the quantity and number of the alvine discharges. He was ordered the potash mixture; and on the 16th he wanted something solid, and was allowed some bread and butter and some rice. On the 17th, 18th, and 19th, the general condition was improving, but the bowels continued to discharge the same unnaturally large amount of ill-digested excreta as in the former case. He had arrived at the eighteenth day of the case, but the radically typhoid condition of the intestines seemed no better. Remembering the happy termination of a previous case, Mr. Walford ordered one drachm doses of the solution of perchloride of mercury every twelve hours, and continued it through the 20th, 21st, 22nd, 23rd, and 24th, when it was taken only at night, and it was discontinued on the 26th. He had taken twelve doses, and it was reported

there was no evacuation on the 23rd, but one on the 24th, natural. On the 24th he was given fancy diet. On the 28th he had the acid mixture, which, after two days, had to be suspended. On February the 1st, there being a slight return of the diarrheea, he was ordered the perchloride for three doses. On the 7th he was sent to the general infirmary, and in due time left the house well and able to work. (*Pamphlet*, 1874.)

The Pneumatic Aspirator in Retention of Urine from enlargement of the Prostate Gland.—Mr. Brown gives full details of an interesting case of retention of urine in which there was such great projection of the prostate gland backwards, that it was impossible to tap, per rectum. The patient was 73, and suffered very severely prior to the operation, from the usual symptoms of prostatic stricture. Catheters could be introduced in the first instance, but their entrance became more and more difficult, and at length impossible. The aspirator was then used, and 28 oz. of urine drawn off. The operation was performed fifteen times, and with the most marked relief. Ultimately the case, though for a time in imminent danger, did well. (British Med. Journal, May 23.)

The Sarcotome.—Dr. Hollis, of St. Bartholomew's Hospital, on the 8th instant exhibited at the Clinical Society an ingenious little instrument to which he has given the above name, and which appears worthy of special attention. It is constructed with the view of cutting through the soft tissues of the body painlessly, and consists essentially in substituting as a cutting apparatus a waxed thread tightened by a spiral steel spring for the caoutchouc tubing which has hitherto acted as the elastic ligature. The spring is confined in a small metal tube closed at one end and wormed as a screw at the other, in order to receive externally a ring. A short cylinder sliding over the metal tube is fixed to one end of the string by means of a screw passing through longitudinal slits in the sides of the tube. Lastly, metal cap fits on the closed extremity of the tube, and the free end of the cap is formed into a ring of metal, so arranged that one opening is terminal and the other lateral. When arranged for use, the free extremity of the spring is forced against the closed end of the tube by means of the sliding cylinder. waxed thread or other ligature is placed round the parts to be severed; the surgeon then passes the ends of the ligature through the terminal opening of the cap and out at the lateral one, and fastens the ends by a screw nut fixed on the outside of the cylinder. The spring is next released by removing the ring, and its whole pressure is then exerted upon the ligature. The instrument exhibited at the Society weighed less than 11 oz., was about 3 inches in length, and capable of exerting a pressure of 11lbs.

Its action, according to Mr. Callender, is absolutely painless. (Lancet, May 23, 1874.)

Aneurism of the arch of the Aorta treated by Galvanopuncture.—Dr. McCall Anderson reports two cases in which considerable benefit and prolongation of life resulted from this method of treatment, and in the course of a clinical lecture makes the following remarks:—The kind of battery to be used is not of very much importance; the principal thing to see to is that it is in good order. Dr. Anderson prefers Stöhrer's battery, and thinks it is best to use one with large cells. As to the strength of the current, he is inclined to believe that in some cases the want of success has been due in great measure to using it too strong, and that it is much better to employ a weak current, continuing the operation if necessary for a longer period of time. The needles to be used should be sharp and fine, and that portion of them which penetrates the skin, the walls of the sac and the intervening tissues, should be insulated with vulcanite. They should be oiled before being introduced. In the majority of cases one needle is sufficient; but sometimes, especially in the case of large aneurisms, two or more may be necessary. is much difference of opinion as to how the needles should be connected with the battery. Dr. Anderson prefers connecting them with the positive pole: both poles, according to Dr. Althaus, are useful in different ways. The positive produces a small firm clot, and the negative a large soft one. When only one pole is in the sac, the resistance encountered by the electricity is so great that a much larger galvanic force has to be used to produce any effect at all. Dr. Anderson remarks upon this that one of the most successful cases recorded by Dr. Althaus was treated with a weak current and a single needle connected with the positive pole. Dr. Anderson prefers connecting the needle with the positive pole because the clot which forms at the positive is much firmer than that which forms at the negative pole, and because there is less danger of hæmorrhage. (Ibid, June 20, 1874.)

Extraction of a piece of Steel from the interior of the Eye by a Magnet.—The following case is so remarkable and instructive that we are tempted to give it entire:—Edward Mills, aged 15, apprentice in an iron shipbuilding yard, consulted Dr. McKeown at the Ulster Hospital, Belfast, on the 21st of November last. He stated that on the previous day, whilst he and another lad were striking a rivet, the two hammers struck each other violently, and a piece of metal flew from the hammer and wounded his right eye. A wound appeared in the cornea, beginning in its centre, and passing out towards its outer margin. It seemed to be superficial at the centre,

and to become deeper and penetrate as it passed outwards. The sphincter of the pupil was cut at the outer margin, and the iris at that part retracted towards its peripheral attachment. The boy could count fingers easily; but no accurate determination of the degree of vision was made, in consequence of the extreme tenderness of the eye. The ophthalmoscope showed no trace of opacity of the lens; and the fundus of the eye could be seen distinctly, except a small part at the temporal side. Deep in the vitreous body at that part were observed, by direct illumination, opacities situate near to the retina, and showing a marked tendency to a dependent position, as if somebody were pulling them down. Sometimes, at the lower part of one of the opacities, a silvery streak appeared, as if from the sharp margin of a bright metallic body. On throwing the light obliquely from the mirror held to the left of the middle line of the patient, and placing the eye in such a position as to receive the rays reflected from the opacities, they appeared red, with a very lustrous aspect, as if some bright reflecting substance were imbedded; whilst the margin before referred to could also be recognised. To all present at the examination, the evidence of the presence of a foreign body, masked by a slight effusion of blood in the vitreous, was convincing. The metal had taken an extraordinary course, as, after penetrating near the centre of the cornea, wounding the iris, and passing behind it, it turned round the margin of the lens, apparently without wounding it, and entered the vitreous body.

Next day the patient reported that he had suffered from intense pain in the eye and brow during the night. The media of the eye had become so cloudy that the disc was obscurely seen, and the foreign body could no longer be detected. It was plain that the eye was threatened with a rapidly destructive inflammation, and that immediate interference was necessary. By keeping the patient lying on his face for some time, the body came again into view.

In a case such as this, Dr. McK.'s course of action, according to the practice of the profession and the advice in standard works, should have been—1. To make a wound in the sclerotic near the site of the foreign body, and hope that it would be expelled with a quantity of vitreous humour, and if not, to endeavour to seize it with forceps; and, if these efforts should be fruitless, to rest satisfied if the injuries inflicted should excite suppurative inflammation and total loss of the organ; 2. To allow the body to remain, and trust to the chance of its being encysted, but be prepared to enucleate the eye, should inflammation set in of such a character as to destroy the eye and endanger the other.

The prospect from either of these methods was not inviting. Dr. McKeown knew of only one case recorded in which metal was extracted from the vitreous body by forceps with preservation of good vision; and the cases in which metal becomes encysted, and never gives further trouble, form but a small percentage. The universal experience of the profession, showing great peril of total loss of vision from foreign bodies in the vitreous body, made him determine to extract it; but Dr. McK. had the gravest doubt of its accomplishment by forceps. He had given the matter for some time some thought, and had come to the conclusion to try, in the first case in which the presence of a piece of steel or iron was undoubted, the power of magnetic attraction. He had obtained a bar-magnet about eight inches long, one inch broad, and one line thick, and tapering at both extremities to a blunt point.

The patient having been etherised, Dr. McK. made an incision about two and a half lines in length in the sclerotic at the outer part, about two and a half lines from and parallel to the corneal margin. A pair of iridectomy-forceps were introduced into the vitreous humour, but they failed to touch the body. He then tried the magnet. He introduced the pointed end into the vitreous humour as far as its shape would admit, and directed it backwards towards the posterior pole of the eye. The foreign body was felt to become attached; but it was only on the third trial that he had the satisfaction of withdrawing the metal on the end of the magnet. It was oval in shape, about a line long, and half a line broad, sharp on the edge, particularly on one side. The thickest part was about a quarter of a line. It weighed half a grain.

Although the magnet seemed a clumsy instrument to thrust into the eye, yet it answered the purpose admirably—it fulfilled the important indication of perfectly preventing loss of vitreous humour during the operation. The foreign body was twice removed from the magnet by the grasp of the margins of the sclerotic wound. For this reason it would be an advantage to have on each side of the end of the magnet a little slide, which could be pushed down about a line past the extremity of the magnet, so as effectually to shield the foreign body from contact with the edges of the wound at the time of withdrawing the instrument from the eye.

The vitreous body, while it retains its structure, offers great resistance to the passage of a foreign substance through it by magnetic attraction. Suppose a piece of metal to be under the influence of the magnet, and that the vitreous body between the substance and the magnet be sound, the most powerful magnet will not draw the foreign body through the vitreous humour; but the vitreous humour, if there be no space to move in, will move in mass with the body, and attempt at extraction will fail. Hence it is necessary that the vitreous humour intervening should

be broken up, so as to make a passage whereby the metal may pass. The knife by which the incision is made should be used for this purpose, or even the end of the magnet itself. So, suppose the metal should have entered by the sclerotic, then the incision should, as a general rule, be made at that part, as the magnet will tend to attract the body along the track it has already traversed. In such a case, also, a powerful magnet may be used in another way—viz., by applying one pole outside the eye, so as to draw the metal to the wound; and, the body being thus held by magnetic influence, it may be seized with forceps and extracted.

Dr. McK. states that he is not aware of magnetic attraction ever having been used for extraction of foreign bodies from the vitreous body, and he trusts that the extremely satisfactory results in this case may lead to its recognition and adoption. Before applying it, the surgeon should know (1) that the foreign body is steel or iron, or some other metal attracted by the magnet; (2) the region in which the body is; (3) that the foreign body is not imbedded in one of the tunics of the eye, or enveloped in fixed organised inflammatory deposits. To avoid this complication, the operation of extraction should be attempted as soon after the accident as possible.

The boy remained in hospital three days, and was subsequently treated as an extern patient. The treatment consisted in the instillation of a solution of atropia and the application of the compress bandage. No pain was felt after the operation; the media of the eye cleared rapidly, and the vision improved from day to day. In a short time the wound in the cornea was scarcely perceptible; the iris, where it was cut and bruised seemed to atrophy, the rest of it remaining healthy; the lense retained its transparency; the vitreous body showed some slightfilmy opacity where the foreign body had been lodged. The field of vision was perfect, save the small part to the nasal side corresponding to the part of the retina in the neighbourhood of the wound.

On the 13th of December last, Dr. McK. brought the patient before the members of the Ulster Medical Society, when the state of matters above described was found; his vision was tested, and it was found that he could read No. 2 of Snellen's types at one foot—a degree of acuity extremely satisfactory. In fact the boy noticed very little difference between his eyes. He resumed his work soon afterwards, and has continued well ever since. (British Medical Journal, June 20, 1874.)

ABSTRACT OF A CLINICAL LECTURE BY DR. ANSTIE ON A CASE OF TYPHLITIS AND PARTIAL PERI-TONITIS.

(Delivered at Westminster Hospital.)

This patient is a lad of 17 years, rather pale and delicate looking. Respecting his family history he tells us that his father and mother both died comparatively young, of "asthma;" which probably means consumption, for, as you know, spasmodic asthma is not a mortal disease, and even chronic bronchitis with emphysema does not often produce fatal results before the age of 50. He also says that he himself suffered from asthma as a child, by which I suppose he means, vaguely, a tendency to bronchial catarrh. Otherwise he has had good health.

On Good Friday last (April 3), in jumping over a hurdle, he slipped, falling with his stomach across the back of the hurdle; but he felt no ill effects at the time beyond the shaking, and losing his breath. I doubt whether this contributed anything to his present illness, but it is possible that either this, or the lifting of heavy weights in his business as a greengrocer's assistant, may have made his abdominal muscles tender, and thus caused the pain in his subsequent inflammatory attack to be felt more diffusedly than it otherwise would have been.

Anyhow, there was nothing seriously the matter with him till June 2, when he was taken with severe pain in the abdomen and sharp diarrhea, which he attributed to his having eaten some unripe gooseberries the day before. The pains increased in severity, and on the morning of June 4 he shivered, and was also very sick. He was admitted to the hospital the same afternoon. On admission he complained of a great deal of pain on pressure being made anywhere in the abdomen, but more particularly over the lower part of the belly, especially in the right iliac and hypogastric regions. The active or spontaneous pain seemed to be worse at night. He had had no recurrence of the shivering or the vomiting since the morning.

The case was at first naturally regarded by the house-physician as one of colic from irritant matters in the bowels: and the patient was ordered a pill of calomel and opium, to be followed by a rhubarb aperient. He was put on a light diet of milk and beef-tea.

Next day, June 5, it was reported that the bowels had not been opened; there had been no further sickness. The abdomen was very tender, and the abdominal pain pretty generally diffused, but there was still the same localisation of severest pain and tenderness in the right iliac region. Generalised peritonitis, one was tolerably sure, was not present; for the patient neither had the characteristic anxiety of face, nor the thready "abdominal" pulse, nor did he lie with his knees drawn up. The case was still regarded by me as being principally of a spasmodic character, and an emollient enema containing some chloroform was thrown up into the bowel; at the same time the cataplasm, sprinkled with laudanum, was applied to the abdomen. The enema opened the bowels freely, and the pain seemed relieved at the time, but it returned soon afterwards. At 8 P.M. that evening the temperature was 101.4°.

From this point forward there was no mistaking the inflammatory nature of the case, although the temperature was not very high, being only a little over 100° on the average at night (when the fever was greatest) between the 5th of June and the 10th, on which latter day decided improvement commenced. But you must recollect that in some of the most serious cases of abdominal inflammation the temperature is never very greatly raised, and meantime our patient, on the 6th, 7th, 8th, 9th, and 10th of June, seemed to get progressively worse; the pain became more and more severe, and on the 9th we find this report by my clinical clerk, Mr. Streeten: - "Patient has had a very had night: he was very restless and got no sleep for the pain. He has been sick twice this morning. The pain in the abdomen is very sharp indeed, it comes on at intervals and appears to be confined chiefly to the lower and right side of the abdomen, in the region of the Patient does not always lie in the same position, and the legs are not apparently drawn up with a view of relaxing the abdominal muscles. No appetite; mouth parched and dry; patient very thirsty. Tongue foul and dry; bowels have not acted; pulse 96, weak and irregular."

On the 10th the morning report is as follows:—"Patient is decidedly worse; he has been in a great deal of pain all night, and can get no rest whatever. He is very sick this morning, and vomits matter with a most offensive odour; he cannot keep either the pills or the mixture on his stomach" [I shall speak of the treatment presently, in a separate and continuous manner], "but returns them almost as soon as swallowed. The pain is very sharp indeed over the region of the cæcum, and, as he expresses it, feels as if a sharp knife were being run through him. It is not persistent, but comes on at short intervals.

between which he has a little rest. He lies chiefly on the right side, with a view of easing the pain. He takes all nourishment now per rectum (beef-tea enemata three times daily); frequently the enema is not retained." To this report I may add, that the cæcum was very obviously distended with gas, but that there was no very pronounced general distension or tympanitis of the belly. The pulse was feeble and irregular. Altogether, things began to look critical; and we were the more on the look-out for danger, on account of the fatal termination of another case of typhlitis which has recently been in the same ward, and to which I shall make special allusion presently.

From the afternoon of the 10th, however, things took a decided turn for the better. The vomiting temporarily ceased, allowing the pills to be retained on the stomach, with the result that the pain subsided, and the next morning we were informed that the patient had slept more than six hours. From this point there was really very little to remark; no more sickness, and only one trifling recurrence of pain. On the 13th he resumed taking his food by the mouth; at first only milk and beef-tea: on the following day he had a natural motion, the distension in the iliac region had almost entirely subsided, and we cautiously began to add solids to his food. He has never had any recurrence of bad symptoms, and to-day (26th June) he is walking about the ward, and eating middle diet.

I now beg to call your attention to the treatment which we followed from the moment it became apparent that the case was inflammatory, and not merely one of irritation of the intestine by unwholesome food. This consisted in the administration of opium, half-grain doses every four hours. This is but a moderate quantity; and at the time when the symptoms became most threatening I was on the point of giving much fuller doses, viz., a grain of powdered opium every two hours. The case, however, had so far not exhibited very serious symptoms, and the patient, moreover, had not that particular previous history which I shall tell you makes these cases more grave when we discover its existence.

In fact, this case is but a mild example of a disease which often takes a far graver turn. The reason of its mildness is not very difficult to find. The man was young, there is no reason to think that he had received any serious injury to the part; and he had not been previously the subject of chronic constipation. With traumatic typhlitis we shall not concern ourselves to-day, since it does not wear any special aspect beyond that of traumatic enteritis in any other situation. Inflammations of the caseum and ascending part of the colon have a special tendency to arise in great measure as the result of habitual distension of those portions of the bowel. You must be well

aware, in the first place, that many persons are always careless as to obtaining regular evacuations, and also that in later life any irregularity that may have been set up is likely to be much increased by the failing tone of the intestinal coats which naturally occurs in old age. The first example of this state of things to which I shall direct your notice is that of a patient who lately died in the bed at the other end of the ward. patient was 65 years old; he had some years before had an apparently similar attack to that which killed him, and which itself had nearly proved fatal, and we traced very clearly a history of habitual constipation. His last illness occupied but a few days; on entering the hospital he was suffering from severe abdominal pain and fever, accompanied by stercoraceous vomiting; and no medicine appeared in the slightest degree to check the symptoms. You will remember that my colleague Dr. Sturges allowed me to show you the cæcum and colon after death, exhibiting a very intense inflammation of the mucous membrane of the cæcum and first part of the colon: and you cannot have forgotten that I pointed out how completely the mere paralysis of muscular fibre from the inflammation had sufficed to stop the natural passage of fæces in a bowel the calibre of which was dilated rather than obstructed.

The second example of typhlitis to which I shall call your attention occurred in my private practice; the subject was a lady aged 67, who had been a large eater and much subject to constipation. Here the mechanical distension of the large intestine had no doubt been going on for a length of time, and remedies proved singularly ineffective. Stercoraceous vomiting set in, in an uncontrollable manner, and death occurred on the tenth day.

I am anxious to impress on you the fact that cases which are distinguished by the presence of severe and eventually stercoraceous vomiting occur more frequently than is probably supposed, as the result of inflammatory mischief in the cæcum, with or without a certain amount of localised peritonitis. The mind both of the student and of the practitioner is apt to be directed too exclusively, in cases of stercoraceous vomiting, to the probable existence of a hernia, an invagination or other mechanical snaring of the bowel, on the one hand, or on the other to the mere notion of an accumulation of fæces that requires to be moved by purgatives. As regards the first class of probabilities, I would be the first to insist that every possible search should be made to insure they are not overlooked. But if there is a fair probability that the case is one of mere loading of the bowel, then it is of the greatest consequence that you do not rashly intervene with purgatives given by the mouth. This will be especially the case if the thermometer

reveals a rise of temperature, or if you have considerable distension of the cæcum, tenderness, and the evidence to touch and percussion of a large mass of fæces with or without gas in the cæcum. Moreover, if sickness has set in with any severity, you may be almost sure that purgatives by the mouth will immediately aggravate the symptoms. Under such circumstances the only permissible direct attempt to remove the accumulated fæces is the administration of large enemas of warm water with a long tube. Remember to add either oil or a little salt to the water, otherwise it may be absorbed by the lower part of the intestine and never reach the mass which you desire to soften and set in movement. But even this limited attempt must not be made where high fever and much pain give evidence of intense inflammation. There are then three remedies open to You may attempt to reduce the hyperæmia of the inflamed part by the application either of ice or of leeches (say, a dozen) to the skin; and you must give opium internally in large doses. I use this strong expression advisedly, although I know that many continental physicians ignore opium in such cases; but I am convinced that very inferior results are obtained when opium is omitted. You may think it strange that in cases where obstinate constipation exists a remedy should be recommended which might be supposed likely to aggravate the disease. You must understand, however, that the one object to aim at is a period of entire repose for the bowel, during which the inflammation may spontaneously subside. We owe to the courage and sagacity of the late Dr. Brinton the discovery that after sufficient persistence in this mode of treatment (if it has been begun early enough) the bowel will frequently resume its function and copious motions will be passed. Occasionally you will find that the addition of belladonna (one-sixth of a grain of the extract to one grain of powdered opium) will favour the happy result; for in regard to their operation on intestinal fibre. opium and belladonna are by no means antagonistic to each other. Grasp these facts well; for you may find that it needs a considerable amount of moral courage to persist in this plan against the ignorant entreaties of friends who will implore you to "give something to move the bowels," and may possibly revile you for inaction in the unfortunate case of a fatal result.

One or two words, in conclusion, on the diagnosis between typhlitis with fæcal vomiting and other forms of acute abdominal disease which may be attended with similar vomiting. I need scarcely enter into the necessity for careful search for any possible hernia. The possibility of the intestine being snared beneath a loop of old peritoneal adhesion must always be borne in mind, and the diagnosis may be very difficult. Fortunately, however, the opium treatment is here equally applicable; and

the only further question will be as to the possible advisability of gastrotomy, as to which I must leave you to the advice of your surgical teachers. Invagination is a disease almost confined to childhood; and here again the opium treatment is most likely to do good. As regards the diagnosis between typhlitis with localised peritonitis and general peritonitis, you will remember, in the first place, the rarity of the latter affection, unless there has been a local injury, a septic infection, or localised deposits of cancer or tubercle; and you will recollect that general peritonitis is nearly always marked by general and intense tenderness of the belly, doubling up of the knees, small wiry pulse, and intense anxiety of countenance.

[The above abstract was supplied at the last moment (instead of Bibliography, &c.), in consequence of unexpected accidents. -ED. Pract.

Extracts from British and Foreign Journals.

eatment of Impetigo.—In the article on impetigo, in est volume of the Nouveau Dictionnaire de Médecine et de urgie, M. Hardy observes that in the early period of the se there is little to be done beyond the usual treatment ed for eczema. The cutaneous inflammation is to be comby emollient baths, by cataplasms of starch, by the appli-1 of compresses dipped in emollient liquids, or simply by pplication of violet powder or lycopodium. Saline pures and diuretics may also be given in moderate doses. econd period the treatment is more difficult, and the first ion that arises is in regard to the preservation or removal Some, with M. Bazin, think that no attempt d be made to remove them, believing that they constitute d of protection to the ulcerated skin, and that they ought allowed to fall off spontaneously, the only treatment to plied to them being a little drying powder. gst whom is M. Hardy, are of opinion that the scabs i be removed as soon as possible by baths, emollient s, and the like, which he believes favours cicatrisation of For impetigo of the hairy scalp he uses a vulcanised cap, which is worn night and day. In some cases, where fection is slight and only consists of some scattered plaques, iches them with tincture of iodine, and renews the applievery other day till the scabs fall off. When the scabs ery thick and cover deep ulcerations (impetigo scabida), ces and emollient preparations do not always succeed in ng their removal, and they had better be left alone. ally as their removal is very painful. Nevertheless, in of these cases he has been very successful in effecting a by sealing the part affected hermetically in vulcanised In this second period, bitter infusions and saline purs ought to be prescribed, followed by cod-liver oil, which in the first rank of the remedies to be used in this e, and from four to six spoonfuls may be given per diem. to this in value M. Hardy places the syrup of horse-

radish, the preparations of gentian, of walnut leaves, phosphate of lime, and iodide of iron in syrup or in pills. The arsenical preparations, and especially the arseniate of iron, are very useful. Iodide of potassium is rarely indicated, but in the severer forms of the disease it may be alternated with cod-liver oil and the arseniate of iron. Ointments are not of much value; occasionally, however, recourse may be had to ointments containing calomel, oxide of zinc, tannin, and the neutral nitrate of mercury. Bazin states that he has found advantage from the application of the oil of cade, either pure or mixed with varying proportions of oil of sweet almonds or lard. In rebellious cases sulphuretted lotions and baths sometimes succeed. In the third period, tonic and supporting treatment generally should be continued, and sulphuretted baths are indicated, particularly those containing sodium sulphide, as the Bagnères de Luchon, d'Ax, d'Amélie-les-Bains, de Barèges, d'Aix-la-Chapelle, de Molitg. Sodium chloride baths are also serviceable, especially in scrofulous subjects. At the head of these he places the baths of Uriage, then those of Salies en Bearn, de Salins, de Nauheim, de Kreuznach, and d'Ischlt. Besides the use of the baths, careful attention should be directed to the diet. Fish, pork, game, and, generally speaking, highly seasoned dishes should be interdicted. A little good wine may be ordered. The patient should be placed under as favourable conditions of climate and dwelling as possible. Severe cases are sometimes cured by residence in the country. Exercise in the open air should be enjoined, except in those cases where the disease affects the lower extremities, when the recumbent position is most suitable. Fatigue, and especially late hours, should be avoided. (Nouveau Dictionnaire de Médecine et de Chirurgie, t. xviii. 1874.)

Experiments touching Ammoniæmia.—At the meeting of the Paris Academy of Sciences held March 23, MM. Feltz and E. Ritter presented a communication through M. Robin, on ammoniæmia, in which, from experiments and from clinical and chemical observations, they had arrived at the following conclusions:—

1. The urine, apart from affections of the genito-urinary apparatus, is very rarely ammoniacal. A large majority of cases in which it is alkaline may be attributed to a want of cleanliness of the vessel into which it is passed, or to its admixture with albuminoid substances in a state of decomposition.

2. Urine brought into contact with ammoniacal ferment, the activity of which is demonstrated by its action on a solution of pure urea, does not always undergo decomposition with the same rapidity which is attributable apparently to variations in its composition.

- 3. The urine of healthy animals quite free from any vesical or renal lesion does not become ammoniacal during a prolonged retention in the bladder, even when obtained by the aid of different mechanical means.
- 4. Sounds impregnated with a ferment will not render the urine of healthy animals ammoniacal.
- 5. The urine becomes ammoniacal, but only transiently, when a sound impregnated with ferment is left in the bladder for some time.
- 6. The same effect is produced when a solution of a ferment is introduced into the bladder and retained there for twelve hours by some mechanical appliance.
- 7. Uramic accidents cannot be referred either to retention of urea nor to the ammonium carbonate which proceeds from its decomposition, for the former substance is innocuous, while the latter only produces convulsions when it is in so concentrated a state that it is difficult to admit it can ever attain to in the blood.
- 8. The decomposition of urea into ammonium carbonate only takes place under the influence of a ferment or of chemical agents hitherto unknown. This decomposition does not appear to take place in the blood, for injections of urea and of ferment have not proved effectual in exciting uramic accidents.
- 9. Such accidents have only been observed in experiments when the amount of ferment injected has been so large as to allow the symptoms observed to be referred to septicæmia.
- 10. The following ammoniacal salts—chloride, sulphate, phosphate, tartrate, benzoate, and hippurate—injected in sufficiently strong solution into the blood, produce, physiologically speaking, similar phenomena to those caused by ammonium carbonate. These salts are rapidly eliminated by the urine and by the saliva. The tartrate and benzoate do not undergo their usual alteration. The urine never becomes ammoniacal; the breath is free from ammonia.
- 11. These salts, when in solution sufficiently diluted not to dissolve the blood-corpuscle, nevertheless modify its properties. This is demonstrated by microscopical examination, and by the analysis of gas drawn from the blood; the capacity of absorption of the blood-corpuscles for oxygen is notably diminished, and their resistance to water and acetic acid is on the contrary augmented.
- 12. The authors throw out the suggestion that a part of the symptoms of uræmic poisoning are due to the simple retention in the economy of the ammoniacal salts normally eliminated by the urine without invoking the prior transformation of urea into ammonium carbonate. (Gazette Médicale de Paris, April 4, 1874.)

Composition and Characters of the Urine in Yellow Fever.—Dr. Joseph Jones, of New Orleans, contributes an important paper on the urine of yellow fever to the New Orleans Medical and Surgical Journal, the issue of the first volume of a new series of which has just appeared under the editorship of Dr. Bemiss. Dr. Jones finds that the reaction of the urine in yellow fever is acid. Even in the gravest cases, attended with suppression of the urinary excretion, jaundice, and alkaline black vomit, the urine, however small the quantity excreted, maintains an acid reaction. As a general rule the specific gravity does not vary greatly from that of health, and ranges from 1000 to 1028. In those specimens which gave the highest specific gravity, the increase in density was clearly referable to the presence and increase of albumen. In the worst cases the urine was turbid from the presence of cells and casts of the tubes with granular fibroid matters and colourless corpuscles. During the early stages of the disease the urine is normal in colour; as the disease proceeds it assumes a deep yellow colour from admixture with bile, and after the full establishment of the febrile state, about the third, fourth, or fifth day, becomes turbid from the presence of the matters mentioned above. The colour may subsequently deepen to orange red. In some cases of suppression, although the urea is greatly diminished in the small amount of urine excreted, it is rarely, if ever, entirely absent. As far as Dr. Jones's investigations extend, albumen is an invariable constituent of the urine in well-marked cases of disease, and may appear as early as the first day of the disease, but most generally it appears upon the second, third, or fourth The constituents of bile are almost universally present even in those cases which progress favourably. (New Orleans Medical and Surgical Journal, vol. i. No. 4.)

Caustic Lime in the treatment of Onychia Maligna. —Professor Vanzetti, well known on account of the method so strongly advocated by him of the cure of aneurism by digital compression, proposes a new method for the cure of onychia maligna. He has furnished convincing proofs of the efficacy of this plan in a monograph on the subject recently presented to the R. Istituto Veneto. In this he laid down the principle that the true and chief seat of the disease is situated in, and limited to, the matrix of the nail. He tried the application of the nitrate of lead, recommended by Moerloose, who described twelve cases treated by this means successfully. He thought he could still improve upon this by using some substance which would absort and dry up the pus, and accordingly tried quick lime upon two patients who presented themselves at the hospital with onychia of the feet: in one the disease had developed

spontaneously, in the other as the result of an injury. In one of the patients the lime was left in contact with the affected part without renewal; in the other it was frequently renewed. Both did well, with perfect reproduction of the nail. (Lo Sperimentale, Fasc. i. 1874.)

Retroflexion of the Uterus, causing Sterility: Treatment. &c.-Dr. Sam. Ward, of the Presbyterian Hospital, New York, records an interesting case of a healthy woman, married three-and-a-half years, and never pregnant. Husband healthy, with two children by a former wife. Examination showed the uterus to be retroflexed to the third degree. Dr. Peaslee introduced a uterine sound the curve of which was directed backwards instead of forwards, found the organ to be of the normal length. and before removing the instrument restored the uterus to its normal shape. This procedure gave rise to considerable pain, which however only lasted a few minutes. A ring pessary was then introduced, and being of insufficient size was replaced by The result was an attack of acute others of various sizes. vaginitis. The patient had previously suffered, and still did. from severe vaginismus. Leeches were applied to the cervix by the advice of Dr. Peaslee. Pregnancy then took place, and from circumstances could be determined to be of 285 days' duration. or if not of 294 days, though the former was most probable. that case, however, the spermatozoa effecting the fecundation must have retained their vitality in the passages for nine days. The child was a healthy female, weighing nine pounds. Notwithstanding the stretching of the parts consequent on the delivery of such a child, the vaginismus remained equally severe. Dr. Peaslee ordered the surface to be brushed over with a solution of nitrate of silver containing 20 grains to the ounce; no second application was necessary. From this case it appears that a retroflexion in the third degree may exist and be the cause of sterility, without manifesting its presence by dysmenorrhœa or any other rational sign whatever; that a degree of vaginismus which commonly proves a source of sterility is not necessarily so, and may sometimes be very readily relieved; and lastly, if Dr. Ward's interpretation of the case is correct, we learn that a spermatozoon may remain in the Fallopian tubes or elsewhere in the female organs and retain its vitality for a period of at least nine days. (American Journal of Obstetrics, No. 2, 1874.)

Cod-liver Oil.—Dr. Kirchner, of Kiel, states that the codliver oil consumed in Germany comes almost exclusively from Norway (Bergen), where it is extracted from the liver of the Dorsch (Gadus callarias) and of the less common Köhler (Coalfish Gadus carbonarius), both of which are chiefly found on the north-west coast of the Lofoden Isles. In France and England, the oil chiefly used is obtained from the Kabliaus (Gadus morrhua), which chiefly frequents the sea off Newfoundland, but is found also around England and Greenland. The oil of the liver of certain rays, recently recommended, as that of the Raia batis, clavata, and pastinaca, both smells and tastes very disagreeably, and has little chance of attaining any great commercial value on account of the comparative rarity of the fish. The oil is either obtained from the partially decomposed livers, which are superimposed on one another till the oil exudes from the pressure; or by the thoroughly decomposed livers, from which the oil has been partially extracted in the above-mentioned manner, being boiled in water; or lastly, by the boiling of the perfectly fresh livers, which have been carefully cleansed, in a water bath. The oil obtained by the former method presents a clear whitish tint, or a strong Madeira colour, according to the degree of decomposition in the liver that has preceded the extraction of the oil. The second method yields the dark brown oil. The third method is that adopted by Möller, who has endeavoured to produce a clean medicinal oil. Amongst the organic constituents the most important are the neutral fats (elain), organic acids (acetic, butyric, and baldrianic), and biliary constituents (as the biliary acids and biliary colouring matter); amongst the inorganic are iodine and bromine, in the proportion of about one-half per thousand, phosphorus in still smaller quantity, lime, magnesia, soda (partly as sulphates and phosphates, partly in the form of sodium and calcium chloride); also trimethylamin or propylamin. The specific gravity of cod-liver oil is lower in proportion to the clearness of its colour, and its consistence is also less the clearer it is. On the other hand, the capability of permeating animal membranes and capillarity are greatest in oil of a dark colour, and in oil having a large proportion of the biliary salts in its composition. The presence of the biliary acids is proved by the production of a cherry red colour on the addition of sulphuric acid. The degree and rapidity of its oxidisability are tested by the addition of a watery solution of permanganate of potash (003 — 0.12 in 120). All cod-liver oils are soluble in ether. smell of the clear oil is fishy, of the darker disgusting. taste of the former is not unpleasant, of the latter bitter and penetrating.

From the researches of Oswald Neumann it appears that codliver oil is superior to all other oleaginous substances in regard to its easy and complete absorbability, as well as its combustibility. These qualities are partly owing to the presence of the biliary constituents, partly to the abundance of elain. The iodine contained in the oil is too small in quantity for much of the therapeutic value of the oil to be ascribable to it. The same elements are also found in nearly the same proportion in whale oil, which cannot be compared with cod-liver oil in efficacy.

In regard to the therapeutic value of cod-liver oil, some difference of opinion exists among different observers. A condition of primary importance for the use of cod-liver oil is the absence or the removal of all symptoms of gastric and intestinal catarrh, especially also all external changes of the intestine, such as deposition of tubercle or ulceration. The dose should be gradually increased: in large doses, a part of the oil, about one-third, is evacuated by the intestine. It is useful to allow a short period to intervene now and then, in which no medicine is administered. The best sign of its beneficial influence is an increase of weight. The patient should also feel more capable of muscular action, and a diminution of any abnormal secretion. An increase of white corpuscles has been demonstrated by English observers.

Of the many diseases for the treatment of which cod-liver oil has been prescribed, tuberculosis of the lungs, scrofula, and some skin diseases are the only ones in which it is now given. The free use of the oil in lung-tuberculosis by English practitioners is materially limited in Germany, where it is only considered to be of service in the first stage of the disease, and especially when there is a well-marked scrofulous constitution. It is a valuable remedy when given in combination with careful regimen (milk-cure), and with the preparations of iron. It may be much more liberally given in the various stages of scrofulosis, though here also attention must be paid to the diet. It is not of much service before the termination of the first dentition. It proves most valuable in those of florid aspect, but is less serviceable in the torpid scrofulous habit. Children in general take cod-liver oil better than adults, but here also intervals should be allowed during which no medicine should be given, since, as Decaisne has shown, when the quantity taken has risen to a certain amount, the body is, as it were, saturated with the oil, it ceases to gain in weight, and the appetite even diminishes. As measures aiding the action of codliver oil, the Soolbaths and the drinking of the Adelheidsquelle (Adelaide Spring) waters may be mentioned. The patient may also take the preparations of iron, as the ferrum lacticum, tinct. ferri acet. (Rademacher) syrup. ferri iodidi; infusion of roasted acorns with some roasted coffee mingled with it, and the pulv. cort. cinchon fuscæ (1:12). Cod-liver oil has been much recommended in rachitis. The beneficial effects obtained by the internal and external use of cod-liver oil in skin diseases, as described by Hebra, Bärensprung, Hutchinson, Larsen, and Malmsten, have not at present received any satisfactory explanation. The diseases in which it has been found especially useful are eczema, impetigo, psoriasis, and lupus. Very large doses, as from six to eighteen dessert spoonfuls, are given per diem. (Berliner Wochenschrift, 1874, 1, 2.)

Therapeutic value of Ipecacuanha administered as an Injection.—M. Chouppe states that in 1873 Dr. Bourdon first used the decoction of the root of ipecacuanha as an injection per anum in two infants attacked with severe diarrheea; the results were most satisfactory. M. Chouppe was hence induced to try it in the diarrhea of tuberculous patients, and met with equal success. The preparation and dose he has found best are as follows:—Twenty grammes of bruised ipecacuan root are boiled in 500 grammes of water divided into three parts, each portion being boiled on the root for ten minutes. The three decoctions are mixed together and boiled down to 240 grammes. to which are added about ten or twelve drops of laudanum. This is enough for two injections. For infants the dose is proportionately less, and no laudanum is added. Two injections are administered per diem to the patient, the first being given between 7 and 8 A.M., that is to say two hours before food; the second about 8 P.M., that is to say about three hours after the last meal. Vomiting was never observed. M. Chouppe found that injection of decoction of ipecacuanha into the veins of an animal produced violent vomiting and remarkable dryness of the mucous membrane of the intestine. The chief substances taken up by water boiled on the root are emetine and tannin; and both appear to have a powerful influence in checking irritation. The conclusions he arrives at from the review of a number of cases of diarrhea thus treated are:—1. That ipecacuanha, administered in the form of injection, produces very satisfactory results in the diarrhea of tuberculous patients and in the choleriform diarrhea of young children. 2. By this proceeding the disorders of the stomach frequently caused by ipecacuanha are avoided. 3. Injections per anum can be continued for a long time without producing any trouble of the digestive function, nor weakening of the patient. 4. Ipecacuanha under these circumstances seems to act by absorption. (Bulletin Gén. de Thérapeutique, June 1874.)

Influence of Anæsthetics on the Vaso-motor Centres.—An interesting paper appears in the Boston Medical and Surgical Journal on this subject, by Messrs. Bowditch and Minot. The anæsthetic principally used was sulphuric ether; but, for the sake of comparison, experiments with chloroform were also instituted. Anæsthetics, the authors point out, may be regarded as antagonising the effects of irritation of sensory nerves; and it is interesting to inquire how far this antagonism extends to other effects of the same irritation. One of the most constant

effects of such irritation is a rise of the arterial blood pressure. due to reflex stimulation through the vaso-motor centres of the muscular walls of the smaller arteries, especially those of the Their first object was to determine the effect of anæsthesia on this reflex rise of blood tension; and to avoid the influence of muscular contractions, the animals were rendered motionless by poisoning the animal with woorara, and life was maintained by artificial respiration. The saphena nerve was exposed and excited with the secondary current of a Dubois-Reymond induction apparatus, the primary current of which was supplied by one Grove cell. The effect was invariably a rise of the blood tension in the carotid artery, amounting usually to from 30 to 60 mm. of mercury. The animal was now subjected to the action of the ether, and the experiment repeated, and it was found that in the majority of cases the rise of blood tension consequent upon the irritation of the saphena nerve was less marked when the animal was under the influence of ether than when the anæsthetic had not been given. The influence of chloroform was much more marked and definite in the same Another very frequent though not absolutely constant result of irritation of sensitive nerves is a diminished frequency of the heart's beats. A great difference in regard to this point was noticed in the two anæsthetics. Chloroform caused invariably a decided depression of the blood tension. varying in the different observations from 8 to 37 mm. of mer-Ether, on the contrary, caused in the majority of instances a marked rise of tension, varying from 9 to 51 mm. of mercury. Both agents were variable in their action on the pulse. sometimes causing an acceleration, sometimes a retardation of the pulse.

The general results at which they have arrived are, that in all probability (1), Chloroform inhalation lowers the reflex irritability of the vaso-motor centres, thus diminishing the power of an irritation of sensitive nerves to cause a rise of blood tension; (2), Ether acts, if it acts at all, much less powerfully in this respect than chloroform. The paper is illustrated by numerous tracings. (Boston Medical and Surgical Journal, May 21, 1874.)

The treatment of Intermittent Fevers by the hypodermic injection of Quinine.—Dr. Frederick Lente, of New York, states that for two years past he has been endeavouring to surmount some of the difficulties attending the practical application of this mode of treatment, and to test the value of the reports heretofore published. It appears that Dr. Chassaud, of Smyrna, was the first experimenter who, in 1861 or 1862, tried the hypodermic use of quinine. Yet the reports upon the subject have been few, and evidently very little faith exists in

the profession in regard to its safety or efficiency. Dr. Chassaud, however, reported that of 150 cases he saw but one relapse after three months, using generally but a single injection; and others are quoted by Dr. Lente. Amongst the accidents which are alleged to occur are, inflammation of a circumscribed character, abscess, sloughing, and even tetanus, and some of these occurred in Dr. Lente's practice whilst he was a novice in the method and was experimenting with solutions of various composition. He reviews the various solutions that have been proposed, and points out that some are perfectly impracticable. After trying many, he adopted the following formula:—

B. Quinæ disulph. gr. 50 Acid sulphuric dil M 100 Aquæ fontanæ 3j Acid carbolici M.v. Solve.

Place the quinine and water in a porcelain dish over a spirit lamp; heat to the boiling point, and add the sulphuric acid, stirring with a wooden spatula. Filter at once into a bottle and add the carbolic acid. This gives fully six grains to the drachm. Dr. Lente can recommend this solution with considerable confidence, as it has been used upwards of 150 times; each time two insertions being made, without serious trouble. In one case a diffuse cellular inflammation of the arm occurred, which yielded slowly to cold water applications; and in another exceptional case anæsthesia of the part was observed, followed by dry gangrene of a small mass of cellular tissue. Patients frequently experience a numbness of the head, sometimes lasting for several weeks, possibly from the effect of the carbolic acid. It is important to have a gold needle, not one merely gilded; and the piston should be frequently oiled, as it is both stiffened and rendered rotten by the solution. The injection should be done deliberately, and the best time is just before the expected paroxysm or during the attack. In slight cases 2 or 3 grains of quinine may be injected, but in obstinate cases the dose may be increased to 6 grains. In a severe epidemic it is necessary to repeat the dose every fourteen or twenty days; in some cases every six days, and now and then every day or two. This method would seem to be particularly applicable to those fatal cases of the disease called "pernicious" or "congestive fever," in which no reaction, or a very imperfect one, takes place, and a patient dies as in the collapse of cholera, because neither the stomach nor the rectum will absorb medicine, even if they could retain it and there were time for it to act; to cases when vomiting is persistent or when intense pain or other distress is a prominent symptom; to quotidian fevers, when the paroxysm is so protracted as to afford little time for the action of remedies by mouth or

rectum; to patients who cannot tolerate quinine on account of cerebral symptoms; and to the poor, to whom cheapness is an object. Dr. Lente records a large number of cases showing its beneficial results. (New York Medical Journal, March 1874.)

Prolapse of the Umbilical Cord.—Dr. George Engelmann is contributing some good papers on prolapse of the cord to the American Journal of Obstetrics. He finds the proportion of cases in which it occurs in primiparæ and multiparæ in the Lying-in House, amongst nearly 6,000 cases, is one prolapse to 108 parturient primiparæ; whereas in multiparæ the ratio is as 1:85, making the occurrence of the prolapse somewhat more frequent amongst multiparæ than amongst primiparæ (1.27 : 1). In vertex presentations, he believes the sacro-iliac fossæ to be the spaces in which the funis most frequently finds room to descend; in foot, cross, or shoulder presentations the prolapse usually takes place in that part of the pelvis to which the feetal insertion of the funis is directed; and this mostly being the sacrum, the cord is thrown into the shelter of one or the other of the sacro-iliac fossæ. A very full account is given of the post-mortem appearances in children who have died from compression of the prolapsed cord. In regard to the prognosis, he finds that out of 202 cases of vertex presentation, the life of the child was saved in only 76, being 36.7 per cent., for which he gives reasons. The mortality among the face presentations is smaller, four out of six children being saved. In breech presentations, only four out of ten were saved. Foot cases have been the most successful cases at his hospital. Among his 365 cases of prolapse, he has had sixty-nine foot presentations with forty-nine of the children, or 71 per cent., saved. Even in the out-door department 68 per cent. of all the cases of foot presentation with prolapse were saved. In transverse and shoulder presentations there was greater success than might have been expected, 50 per cent. of the forty-seven cases being saved. As a general rule, a prolapse taking place in a primipara gives a much less favourable prognosis for the child than in a multipara; and for this also he assigns reasons. (American Journal of Obstetrics, February 1874.)

CORRESPONDENCE.

ON THE CURATIVE POWERS OF BROMIDE OF POTASSIUM.—We have received the following note from Mr. Kesteven:—

"Will you permit me to offer one remark upon a sentence in the 'Notes upon Potassic Bromides,' by Dr. Mickle, published in the June number of the Practitioner? The following sentence therein occurs:—'Excluding such more favourable asylum cases we retain a class in which results of treatment cannot be compared with the cures¹ of epilepsy claimed for bromide of potassium by Drs. Reynolds, J. W. Begbie, E. H. Clarke, Mr Kesteven, and others; though such cures have not been observed by Dr. Anstie.'

"If Dr. Mickle will do me the favour to read my paper again, he will find that I have not, either directly or indirectly, claimed to be able to cure epilepsy. I have an aversion to the pretension of promising to cure any disease, even a common catarrh; so impossible is it to foresee, in every case, what accident or complication shall occur. I hold that all the medical practitioner has to do in any disease, is to use to the best of his ability the

remedies he may select as adapted to restore health.

"The only sentence in which the word cure occurs in my paper is in the closing paragraph, wherein I observe, that 'when these medicines (bromides) are not efficacious to work a cure their influence is sufficient to diminish the severity, and to prolong the intervals of epileptic seizures.' I may add that subsequent experience of the administration of bromide of potassium has confirmed this conclusion and has strengthened my confidence of the value of this remedy in epilepsy, is steadily persevered with in large doses."

¹ The italics are not mine.

² Journal of Mental Science, July 1869.

Department of Public Seulth.

THE SANITARY LAWS AMENDMENT BILL.

THE Sanitary Laws Amendment Bill, introduced by Mr. Sclater-Booth and Mr. Clare Read, and now under the consideration of Parliament, is precisely what its name implies it to be. It explains and amends certain defective provisions in the Public Health Act 1872, and amends and extends the provisions of other Sanitary Acts relating to the powers and duties of Sanitary Authorities, the constitution and election of Local Boards, the borrowing powers of Sanitary Authorities, the audit of accounts, and the operation of subjects to be included in the bye-laws. It contains also sundry miscellaneous provisions.

The majority of the provisions of the bill deal with legal imperfections of existing Sanitary Acts, and are directed to the removal of these. Such of its provisions as relate to the extension of sanitary powers throughout indicate great caution on the part of its framers, and for the most part fall far short of the corresponding provisions in the bill promoted by Sir Charles Adderley and others last year.

Among the proposed amendments is a provision for removing a difficulty in carrying out Section 10 of the Public Health Act 1872. This section provides for the joint appointment of certain officers for two or more sanitary districts, but the mode of making such joint appointment is not prescribed. Section 5 of the present bill provides that when two or more Sanitary Authorities agree to join in the appointment of a medical officer of health or inspector of nuisances, the Local Government Board, if they approve of the agreement, shall, by order, pre-

scribe the manner in which such officer shall be elected by the authorities so joining in the appointment, and determine the proportions in which the reasonable expenses of and incident to such election shall be borne by such authorities respectively. Section 10 of the bill makes the very necessary provision for including among the special expenses of a Sanitary Authority as defined in Section 17 of the Public Health Act 1872, the expenses of the maintenance and cleansing of sewers, and of providing, repairing, and cleansing public wells, where duly authorised in any contributory place.

Three sections of the bill (12, 13, and 14) are devoted to an amendment and extension of the law as regards Port Sanitary The first of these sections provides for the repre-Authorities. sentation of riparian authorities on a Port Sanitary Board; the second for the exemption of a riparian authority from contribution if the Local Government Board thinks fit; and the third for the combination of the authorities of several ports if necessary. So far as we can make out, the difficulties which beset the question of Port Sanitary Authorities, as provided for in the Public Health Act 1872, seem to originate solely in the definition of a port given in the Act. By this Act it is provided (Section 20) that "a port shall mean a port as established for the purposes of the laws relating to the Customs of the United By this extraordinary definition, the revenue Kingdom." organisation of a port was made the basis of its sanitary organisation. Now, a Customs port may and most commonly does include several ports in the ordinary sense of the word: and in such cases, if port sanitary organisation means anything practical and practicable, the efforts of the Local Government Board must have been chiefly devoted to obviating difficulties occasioned by the definition of the Act. The amendments of this bill under consideration, as to Port Sanitary Authorities, seem, so far as we can conceive their meaning, solely devised to removing difficulties which would appear to have arisen from the definition of a port given in the Public Health Act 1872, and which otherwise could hardly attach to the subject.

Section 20 of the bill strengthens the hands of the Local Government Board in proceeding against defaulting Sanitary Authorities, by providing that any order issued by the Board under the 49th section of the Sanitary Act may be enforced by writ of mandamus.

The 21st section of the bill deals with the important question of the cleansing of streets, privies, and ashpits, and it imposes this duty, subject to a penalty for neglect, upon urban Sanitary Authorities, if the Local Government Board see fit so to direct. The section is as follows:—

"Every urban sanitary authority shall, when the Local Government Board by order so direct, make due provision for the proper cleansing of streets, the removal of house refuse from premises, and the cleansing of earth closets, privies, ashpits, and cesspools within its district.

"If any sanitary authority having made such provision fail, without reasonable excuse, after notice in writing from the occupier of any house situated in such district requiring such authority to remove any house refuse, or to cleanse any earth closet, privy, cesspool, or ashpit belonging to such house, or used by the inmates or occupiers thereof, to cause the same to be removed or cleansed, as the case may be, within two days, the sanitary authority shall on summary conviction be liable to pay to the occupier of such house a penalty not exceeding ten shillings for every day during which such default continues after the expiration of the said period of two days."

A doubt here arises upon the wisdom of limiting the application of a provision such as this to the direction of the Local Government Board. The limitation implies a very imperfect conception of the magnitude of the evil which the provision is designed to meet. The action of the Local Government Board in carrying out such a provision must almost necessarily be very partial, while the evil to be dealt with is very general, and common to many rural as well as urban districts. The fear is lest the operation of such a provision as this will be to transfer, in not a few instances, local responsibility in a very important matter to the Central Government, and to this extent relieve the local authority.

By Section 33 of the bill, a very useful power would be given to Sanitary Authorities to buy up, under given conditions, any water-wells, dams, or weirs which interfere with the proper drainage or water-supply of its district. In not a few places the removal of a dam or a weir is an initial condition of its proper drainage.

The provisions of the bill as to bye-laws, although representing a considerable gain if obtained, will disappoint many.

Section 41 prohibits the commencement of any work coming within the operation of a bye-law during one month from the delivery of notice of it, unless approved by the Authority, and forbids the commencement of it at all if the Sanitary Authority has given notice of disapproval before the expiration of the month. Section 42 provides that any costs incurred by a Sanitary Authority in removing works executed contrary to any bye-laws may be recovered by summary process. Section 43 makes provision for continuing breaches of bye-laws; and Section 44 extends the power of making bye-laws, in regard to the walls of buildings, to the "roofs, foundations, and spouts on the outside thereof, and for purposes of health [whatever this may mean] as well as for the purposes of stability and protection against fire."

Section 45 of the bill gives to every Sanitary Authority power to make bye-laws, to be confirmed by the Local Government Board, "for regulating the lodging and other treatment of persons engaged in hop-picking in the district of such Authority." Why the hop-pickers should be picked out for special sanitary legislation to the exclusion of other quasivagrant segments of the population, is one of those administrative mysteries which no outsider can pretend to understand. Such a provision serves to show with painful prominence the almost entire absence from the bill of any provision for those grave evils which particularly attach to buildings and water-supply in rural districts.

By Section 47 of the bill the Local Government Board is empowered to extend the provisions of the 35th section of the Sanitary Act 1866, as to houses let in lodgings or occupied by more than one family, now limited to populations of not less than 5,000, to the district of any Sanitary Authority. The same section also provides that regulations made for these houses may extend to ventilation of rooms, paving and drainage of premises, and to notices to be given and precautions to be taken in case of any infectious disease.

The important question of polluted water in wells and pumps is dealt with in Section 50, which is as follows:—

"If it shall be represented to any sanitary authority that within their district the water in any well, public or private, or supplied from any public pump, is so polluted as to be injurious to health, such authority may apply to any justices having jurisdiction within their district, in petty sessions assembled, for an order to remedy the same, and thereupon such justices shall summon the person occupying the premises to which the well belongs, if it be private, and, as regards any public well or pump, such other person as shall be alleged in the application to be interested in the same, and shall either dismiss the application or make such an order in the case, by directing the well or pump to be permanently or temporarily closed, or the water to be used for certain purposes only, or providing otherwise, as shall appear to them to be requisite to prevent injury to the health of persons drinking the water. For the purposes of such inquiry, the said justices may cause the water to be analysed at the cost of the sanitary authority applying. And all the expenses incurred by such authority in and about the procuring of this order, and in carrying it into execution, shall be charged upon the funds applicable to their general expenditure, but, in the case of a rural sanitary authority, shall be deemed to be special expenses within the meaning of the Sanitary Acts. Provided that where the order is made in respect of any private well, any person aggrieved thereby may appeal against the same in the manner provided by the one hundred and thirty-fifth section of the Public Health Act 1848, and with the same incidents and consequences. Where the justices dismiss the application, they may, if they think fit, award such costs to the person summoned as to them shall appear to be reasonable."

The permissive character of this section would be fatal, we fear, to its being carried into operation as widely as might be desired. There would, no doubt, be much difficulty in making the provision absolute, and the indiscriminate application of such a provision might lead to evils even greater than those it was intended to abate. But assuming that the provision must be permissive, it would be well to impose upon the Sanitary Authority a definite duty of making inquiry into the nature of any representation made to it under the section, and of recording the result of such inquiry, and the grounds for such action as it might take, or of its inaction, as the case may be, in the minutes of its proceedings.

Section 51 of the bill would practically, as to existing hospital accommodation, give Sanitary Authorities in the provinces the same privilege as is enjoyed by Sanitary Authorities in the metropolis, by declaring that every hospital which shall be declared by an order of the Local Government Board to be situated within a convenient distance of the district of any Sanitary Authority, for the purposes of the 26th section of the Sanitary Act 1866, shall be deemed within the district of such Authority. The same section also provides that a justice's order for the removal of a sick person shall be addressed to a police or

other officer; and that every person wilfully disobeying or obstructing the order shall be subject to a penalty not exceeding ten pounds.

Subsequent sections of the bill extend the operation of Sections 51 (as to the destruction of infected bedding, &c.) and 52 of the Public Health Act 1872 to the metropolis; extend also the right of complaint, under the Nuisance Removal Acts, to nuisances whether public or private, and permit the exercise of complaint as to nuisance by any person aggrieved or injuriously affected (53); bring "milk" within the action of the 2nd section of the Nuisances Removal Act 1863 (54); and empower justices to grant a warrant for search for unsound food (55). Finally, Section 56 of the bill makes the important provision that if any owner or occupier or person employed to let for hire, or to show for the purposes of letting for hire, any house or part of a house, when questioned by any person negotiating for the hire of such house or part of a house as to the fact of there being in such house, or having within three months previously been therein, any person suffering from an infectious, contagious, or epidemic disease, knowingly makes a false answer to such question, the person so answering falsely shall be guilty of an offence punishable on summary conviction, and, at the discretion of the justices having cognisance of the case, be liable to be imprisoned, with or without hard labour, for a period not exceeding one month, or to pay a penalty not exceeding twenty pounds.

Such is a brief analysis of the Sanitary Law Amendment If it avoids the graver questions of sanitary legislation which still remain to be dealt with at least it endeavours to perform the useful task of making good the more troublesome flaws in existing Sanitary Acts.

REGISTRATION OF BIRTHS AND DEATHS BILL

THE Registration of Births and Deaths Bill now before Parlisment is one of those attempts at legislation not uncommon in matters affecting the public health in which the appearance of

compulsion is to be secured without the reality. The bill, in fact, proposes to make the registration of births and deaths compulsory, and directs that they shall be registered; but it makes no provision for the punishment of persons who do not register; for we can hardly conceive that the provision of the bill (Sec. 22) which empowers a superintendent-registrar to prosecute a person guilty of any offence under the Births and Deaths Registration Acts, 1836 to 1874, committed in his district, meets the shortcoming to which we refer. The absence of imposition of penalty for neglect of carrying out the main purpose of the Act is all the more conspicuous from the imposition of penalties for the neglect of certain incidental provisions of the Act. operation of certain provisions (Sec. 18) to prevent the burial of deceased children as still-born, is sought to be secured by a penalty not exceeding ten pounds. Again, the giving of information to the registrar, when sought by him, and the giving or sending of certificates described in the Act, are guarded by a penalty not exceeding forty shillings for each offence in case of refusal. We deeply regret that the main purpose of the Act is not guarded in like manner, and we trust that before the bill emerges from Committee a penalty will be attached to the neglect of registering either a birth or a death.

The portion of the bill which relates to certificates of causes of death affects medical men very nearly. It no longer leaves it optional for the medical man to give such certificate, but requires him to give it, and his refusal to do so would expose him to a penalty not exceeding forty shillings, as set forth in Section 38 of the bill. The imposition of this duty upon medical men, under a penalty, without any remuneration for the trouble involved, raises a question which the framers of the bill have probably not considered with sufficient care. The State may no doubt have the right of calling for such services in the sense of might, but hardly in the sense of justice. Hitherto this service has voluntarily been very willingly rendered by the great mass of the profession; but the very willingness of this service will cause all the more resentment to be felt at an attempt to compel what had before been rendered without compulsion. Even the least resentful of mortals would kick against such unmerited usage. It is no doubt eminently desirable that our registration

of the causes of death should be as complete and as accurate as can be made; but that is no reason that the medical profession should be the scapegoat of this desirable accuracy. If the bill, as to medical certificates of causes of death, be persisted in, in its present form, Parliament must not be astonished if the profession kicks and renders the bill in this respect nugatory. Penalties would be a fallacious security against a general refusal to carry out the obnoxious provision.

It may be a very grovelling ground for a learned profession to take to refuse to be compelled, when they may contribute to unimagined altitudes of vital statistics; but, after all, as old Burton has it, "Commodity rules the world;" and it is too much to expect a bread-and-butter profession to contribute to State statistical aggrandisement without compensation. The difficulty here met with in the Registration Bill has already been confronted in the Vaccination Acts, and there, we believe, successfully overcome. Mr. Sclater-Booth's advisers should have known this. We take it that the proper legislative mode of dealing with medical certificates of causes of deaths, is that already adopted with regard to certificates of vaccination from medical men, not public vaccinators.

The provision of the bill (Sec. 30) for the registration of the cause of death, where no medical certificate is forthcoming, is extremely loose and unsatisfactory. It is idle to seek for an accurate registration if a registrar is to enter in the register his notions of what "he may think sufficient to satisfy himself that the death arose from natural causes." That is a question for a coroner's jury; and if a coroner holds that an inquest is not necessary, the fact of his so holding should be inserted simply in the register without any supposititious cause of death being inserted.

DR. BUCHANAN ON ENTERIC FEVER IN CAIUS COLLEGE, CAMBRIDGE.

In the autumn of last year a serious outbreak of enteric fever occurred in Caius College, Cambridge, which was made the subject of an official investigation, Dr. Buchanan being the investigator. His report is before us, and is a remarkable example of minute etiological research. It is deeply to be regretted that official reports such as this of Dr. Buchanan are not more readily accessible to the public. We can conceive nothing more calculated to enable medical officers of health entering freshly upon their important duties to deal successfully with most complicated questions of outbreaks of disease than the careful study of successful research, such as is contained in this report. they approach the task, rightly apprehend the difficulty of unravelling the different conditions which underlie local prevalence of Particular diseases. As an example of the mode of pursuing such research, Dr. Buchanan's present report is of the rarest interest and instruction. As an illustration, moreover, of one of the modes in which enteric fever is occasionally disseminated it is of exceptional value. It is possible, here, only to indicate the general course and the results of Dr. Buchanan's inquiry, as no abstract can convey a proper notion of and do justice to the various steps of it.

The outbreak occurred in the months of October, November, and December, 1873. It was preceded and accompanied by unusual prevalence of enteric fever in Cambridge, and was in fact a local extension of a prevalent malady. Out of 112 students living in Caius College, there were fifteen cases of enteric fever, while of 152 persons, fifty-one being students attached to the college, but living in the town, there were but five cases. In the immediate vicinity of the college there was an estimated population of 525, occupying 105 houses, and among these persons eight cases of enteric fever occurred; and in Cambridge generally, among a population of about 30,000, the number of cases of enteric fever was estimated at 150.

The great incidence of the disease on Caius College, and its peculiar localisation there, were the subjects of inquiry. The disease was not generally disseminated throughout the college. Of five occupied sets of buildings, two escaped entirely, one case occurred in one set (Gonville Court), two in another set (Library Staircase), and twelve in a third (Tree Court). The twelve cases in Tree Court occurred among sixty-three students, and the interest of the inquiry rests in the investigation of these cases.

The relative incidence of the fever upon the residents and others (non-resident) attached to Caius College and upon the town population, and its probable significance, was studied by Dr. Buchanan with the assistance of the Rev. N. M. Ferrers, tutor of Caius College; and the results are thus stated:—

"The incidence of fifteen cases of fever being wholly upon the 112 students resident in college, and not at all upon the fifty-one students resident in town lodgings, makes it probable that the cause of the fever will not be found in any condition common to the two classes of students. Reckoned from the above figures, the chances that the cause will be found in some conditions peculiar to the class of college residents are 375 to one."

It has already been stated that the greater number of the cases occurred in one part of the college, namely, Tree Court. buildings in this court were erected only four years ago, and "at the time of their erection," says Dr. Buchanan, "such an amount of care and thought was bestowed upon the structural arrangements that it has appeared almost impossible for any injury to health to occur from mischances of sewers, drains, and water-pipes. With an exception or two, to be discussed hereaster, the rule in Tree Court is that there is no sewer or drain underneath any part of any building; that there is no opening within any building to any drain; that the waterclosets are isolated, of approved construction, and that every excrement-carrying drain takes the shortest cut into the environing sewers outside the college. The drains within the area of the court are mere pipes for slops and surface-water. trapped in their course. And the drain-water pipes from the sides of the Tree Court buildings enter the sewers through nine-inch pipes, in each of which a trapping bend (commonly known as a "siphon," a misleading name, and not here used. as true siphon action will have to be spoken of) is provided.

In view of the special sanitary arrangements of Tree Court," continues Dr. Buchanan, "it was not a little surprising and disappointing to observe the occurrence of case after case of fever here, and ultimately to find that out of the fifteen cases of fever among the 112 residents in the whole college, no less than twelve were among the sixty-three residents in Tree Court. Now, the chances against this event, as a matter of à priori probability, are twenty-four to one, an odds so large as to make it necessary to seek the cause of the fever in some condition peculiar to Tree Court, and not operative or greatly less operative in other parts of the college." Let it be added that the water supply of the college, obtained from a water-works company, is excellent in quality and abundant in quantity, and supplied on the "constant system;" and that the site of the college is made earth overlying a thin bed of gravel which rests upon the gault clay.

Such generally was the condition of the building in which the outbreak occurred. Before Dr. Buchanan commenced his inquiry, Dr. Paget, the Regius Professor of Physic, and Dr. Bradbury, both of them physicians to Addenbrooke's Hospital, had investigated the subject, and they had cleared away many of the preliminary questions which required to be solved. They appear to have satisfied themselves that no local atmospheric pollution from imperfect water-closets, or drains, or drain-traps, or rain-water pipes, could have caused the outbreak. They had provisionally acquitted the water-supply of blame, because the supply was common to the whole college, while the outbreak was clearly local; and they had subjected to examination the question of dissemination by means of some article of food, particularly by milk, and had come to the conclusion that, notwithstanding some primâ facie ground for suspecting the milk. the evidence on the whole was against its having played any part in the production of the fever.

At this point Dr. Buchanan took up the investigation, and first going over the questions already examined by Drs. Paget and Bradbury, he came to the same conclusions as they had done respecting local atmospheric pollution having nothing to do with the outbreak, and he was able to set aside entirely any doubt which might have rested upon the milk supply as an agent in its production. When, however, he came to inquire

minutely as to the water-supply of Tree Court, his attention was arrested by observing that the water-supply of this court was obtained through a branch pipe quite distinct from the pipe supplying the rest of the college; that, in fact, the water-supply of Tree Court was obtained from a branch which supplied that He had previously noted that the water-closets in this court were supplied with water in a manner different from the water-closets in the rest of the college. In Tree Court_ indeed, the water-closets were supplied with water direct from the high-pressure constant-service pipes; while in the rest of the college the water-closets were provided with proper independent cisterns. With these facts before him, Dr. Buchanan asked himself whether, "if the water of the particular service to this court had, through a direct connection with some closet, at some time got mixed with water-closet or sewer air drawn into its pipes, had we not here, in Tree Court and not elsewhere, a repetition, at least in essentials, of the conditions to which, at Sherborne, my colleague, Dr. Blaxall, last year distinctly traced contamination of water and consequent enteric fever of a version widespread and intense kind? I remembered too," he adds, "that Dr. Blaxall's observations were in accord with some experiences published about the same time by Dr. Carpenterof Croydon.

Now there were two water-closets in Tree Court, directly supplied from the water-pipes supplying the court with drinking water. One of these closets was situated on an upper floor about thirty feet above the level of the horizontal water-main of Tree Court; an elevation, as Dr. Buchanan observes, which "must have given particular facility for the entry of air into the service-pipes of the closet, if by any chance the service-pipes should have become emptied of their water." The second water-closet referred to was situated in the basement; but the chief interest centres in the closet first described.

The danger contingent upon a direct supply of water from the water-main to a water-closet had not been unforeseen in the original arrangement of the water-pipes. The service-pipes were provided with peculiar valve-taps designed to control any particular sub-service, and to prevent back-flow of water in the service-pipes. For this latter use the tap was self-acting, but

it was ascertained experimentally by Dr. Buchanan that the valve which should have prevented back-flow in the service-pipe supplying the water-closet on the upper floor and the different pantries on the same staircase did not act, and that in the event of the main supplying the service becoming emptied, this particular service would also become emptied. How this state of things affected the working of the particular sub-service, and in what manner it bore upon the outbreak of fever, may be gathered from the following quotation from the report:—

"1. As matter of fact, most of the students' servants about the college, and notably those of Tree Court staircases, spoke of the occasional absence of water from their pantry traps. In Tree Court two or three servants said that after such an absence the water would come on 'with a vengeance,' 'like soda water,' evidently having become mixed with air with which the pipes had become charged. The failure of water was mentioned by some servants as occurring once a month or so; by others as being more frequent; and the servant having charge of the first floor and higher floors of Staircase 'O' spoke of it as a thing that happened two or three times a week. Whence the air in these pipes may have been derived will presently be matter for consideration.

44 2. Under a really constant system of high-pressure water-service it is plain that pipes could not have thus got filled with air. Perhaps a considerable weakening of pressure, not going to the extent of intermission, might have Stopped the supply at high levels; and there were particular circumstances to weaken the pressure in Staircase 'O,' and these doubtless account for the more frequent lack of water here. But real intermission of supply must have occurred to account for the phenomena described. And this intermission must have gone to the extent of allowing the whole horizontal service-main of Tree Court to have become emptied of water, if any hypothesis of mischief resulting from this air in the water-pipes is to be upheld; for the fever attacked every staircase of the court from N to U.

443. Complete intermission of supply was found to have actually occurred on two occasions at least during last term. The earlier occasion can be defined as the evening of the second day of an October frost; and, thus far, might have been either on October 25 or on October 30, but other associations suggest October 25 28 being the more probable of the two days: on this occasion, only the particular service through the Gate of Humility was stopped. The later occasion was, when the water company's servants having, for purposes of pipe-repair, cut off the water-supply of some half of Cambridge, there was hurrying to restore the supply in order to gain water-power to blow the organ of King's College Chapel for a musical service. This fixes the date of the second known intermission at about half-past 10 A.M. on All Saints' Day, November 1.

"4. Now, a fortnight is about the incubation time of enteric fever. A fortnight after October 25 is the date of the first attack in Tree Court. A fortnight after November 1 is the date of the second, third, and fourth attacks. And though it was known that other cases of fever kept dropping in till the end of November, the coincidence of the early fever with these ascertained intermissions was not the less suggestive as indicating the direction that further

inquiry should take."

We have got now to a point in which it has been shown that the outbreak was limited to the particular area of a particular water-supply, and that that water-supply was given under conditions which might possibly lead to the mingling of watercloset or sewer air with the water at certain dates. The further course of the inquiry proved that such mingling, and, still more, even a mingling of excremented matter with the water of the sub-service, must have taken place whenever the particular service-pipes became emptied. The water-closet on the upper floor was fixed over a metal tray, or "safe," to prevent injury to the ceiling below from any accidental leakage. A pipe from this tray to carry off leakage, having a trapping bend in it, was carried into the soil-pipe beyond the water-closet trap. The trappingbend in the "safe" waste-pipe was fed by a "weeping-pipe" coming from the service-pipe of the water-closet. The relation of the trap of the "safe" waste-pipe to the trap of the soilpipe was such that it was to be inferred that the former trap might be, and there is no doubt that it would be, emptied by the rush of water down the soil-pipe when the water-closet was used. The soil-pipe communicated with an unventilated mainsewer, carrying among other matters abundant enteric-fever evacuations at the time of the outbreak in the college; and against the penetration of sewer-air from this sewer into the water-closet, the only protection was the trap on the soil-pipe and the trap on the "safe" waste-pipe. In the event of the service-pipe of the water-closet becoming emptied of water by the emptying of the water-main, the air sucked into the pipe as the water ran out would consist partly of sewer-air from the soil-pipe carried through the weeping-pipe. Probably also the fouled contents of the traps would be sucked in. An examination of the service-pipe and "safe" waste-pipe proved that such in reality had been the case. We quote what Dr. Buchanan says on this point:—

"It was found that the outside of the end of the weeping-pipe, where this dipped into the small S-bend of the safe, was crusted with a brownish matter, uniformly, and as if gradually, laid on; and this pipe and the supply-pipe (taken from between the weeping-pipe and the water-valve) had inside them some little deposit not remarkable in its aspect. Dr. Dupré, having these pieces submitted to him with a rough statement of the physical circumstances, was asked to make such an examination of them as he judged best, in order that an opinion might,

if possible, be formed as to the presence of any fæcal product in the deposits, and he has given this significant report:—

"'I. Deposit inside the pipes.—I cannot detect a trace of sulphide, and there is, therefore, no proof of the action of sulphuretted hydrogen. On the other hand, the deposit, both in the supply-pipe and in the small weeping-pipe, contains a large proportion of nitrogenised organic matter and an appreciable amount of phosphoric acid, both of these in much greater proportion than could possibly be derived from the water used. It would seem, therefore, that water impregnated with fæcal matter must have entered these pipes and so helped to produce these deposits.

"" II. Deposit on the outside of lower end of weeping-pipe.—In this deposit also I cannot detect any sulphide; but it contains, like the other, a very large proportion of nitrogenised organic matter, and a very considerable proportion of phosphoric acid. I cannot doubt, therefore, that this deposit is derived from water strongly impregnated with fæcal matter.'

"In Dr. Dupre's first paragraph I have put the word 'water' in italics. His results show, first, that (as circumstantial evidence had appeared to indicate) excremental matter actually has entered the water-pipes of Staircase P closet; and, secondly, that it has, in fact (what has before been suggested as a possibility), entered the water-pipes as a liquid. In no other way can the presence of phosphates in the interior of those pipes be accounted for.

"The 'water impregnated with fæcal matter,' of which Dr. Dupré speaks, came then from the closet traps, probably wholly from the little one in the safe. The trapping water, then, has been sucked into the water-service pipes. This has consisted of ordinary water-closet washings, but with the addition of anything it had absorbed from the sewer-air with which it was in contact. So that, if the consideration be of importance, it is now further seen that last October, not only in air but actually in water, fever poison may have entered the water-pipes of Tree Court."

We need not follow Dr. Buchanan's instructive report beyond this point. The facts he disclosed fitted closely with the facts of the outbreak and leave no reasonable doubt that this had been determined by the action of the sucking up of sewer-air and fæcal matter at particular times into the water-service of Tree Court, consequent upon the arrangements described. A fallacious piece of ingenuity had been adopted in place of a well-known principle of water-closet construction, with the painful results described. The regulations drawn up under the Metropolis Water Act 1871, and which have the sanction of the Board of Trade, show the right method of supplying water to water-closets fed on a so-called "constant service." These regulations are as follows:—

"20. Every boiler, urinal, and water-closet, in which water supplied by the Company is used (other than water-closets in which hand flushing is employed), shall, within three months after these Regulations come into operation, be served only

through a cistern or service-box and without a stool-cock, and there shall be no direct communication from the pipes of the Company to any boiler, urinal, or water-closet.

"24. No pipe by which water is supplied by the Company to any water-closet shall communicate with any part of such water-closet, or with any apparatus connected therewith, except the service-cistern thereof."

FONSSAGRIVES ON THE HYGIENE OF TOWNS.1

A TREATISE on the hygiene and salubrity of towns, by the learned Professor of Hygiene to the Faculty of Medicine, Montpellier, will be welcome to many English readers. It will be welcome not only for the information which it contains on the subjects of which it treats, but also as permitting a comparison of the teachings which obtain here on those subjects with those which obtain among our neighbours across the Channel. In this latter light there is much that is instructive to be learned from the pages of M. Fonssagrives' work. The work is so conceived and carried out as to be adapted to the wants of educated unprofessional as well as professional readers. Its motto is "Vulgariser sans abaisser," and its scope is well indicated in the closing sentence of the preface: "All our towns, without exception, are invalids; and I have endeavoured in this book to give them a practical consultation, prescribing nothing beyond their resources, seeking no greater sacrifices from their indocility, their caprices, their forgetfulness of their real interests, their love of luxury and estentation, than it is practicable for them to compass, treating them, in fact, as ordinary patients. I have asked for what is indispensable, I have shown what is possible, and between these two terms progress lies."

We do not propose to follow this work from point to point. We shall dip into it here and there for illustrations of its quality, particularly in reference to questions which have especial prominence in England at the present moment; and first, it is natural to turn to the question of sewerage, and the disposal of excremental matters. This portion of M. Fonssagrives' work con-

¹ Hygiène et Assainissement des Villes. Par J. B. Fonssagrives, Professeur d'Hygiène à la Faculté de Médecine de Montpellier. Paris, 1874.

tains much interesting information on the state of sewerage in French towns, and of the opinions in vogue among French engineers and hygienists. It contains, also, an interesting comparison of French and English views on the subject, the latter being largely founded on the work of Professor Corfield. M. Fonssagrives does not appear to be acquainted, except it may be at second hand, with the various official reports of the English Government, engineering and medical, on the subject of which he treats. This is to be regretted, as these more certainly represent English principles and practice as to sewerage than the works from which he quotes. The results of M. Fonssagrives' experience on the subject will be read with great interest in England at the present moment. He has come to the conclusion. although not wishful as yet to express it otherwise than provisionally, that the most preferable system for the removal of excremental matters from the majority of towns is by means of pails, which receive the whole of the excrement and urine, sewers being reserved for slops, manufacturing refuse, and rainwater only. He observes:-

them by pails (tinettes) receiving the whole of the excremental discharges, which should be disinfected before being used as manure, either simply or after undergoing some process of manufacture. The contents of the sewers would thus be reduced to house-slops, liquid manufacturing refuse, and rain-water in a state relatively innocuous. This sewage might be permitted to run directly into streams, or be subjected previously to filtration or chemical depuration." (P. 267.)

It will be observed how closely the opinions here expressed as ree with the conclusions now being put extensively in practice in many of our large towns. We do not propose to discuss them, but simply to record them as showing that the experience of the learned Montpellier professor tallies with that of much English municipal experience. We may observe, however, that his suggestion that house-slops and manufacturing refuse may be permitted to run unpurified into streams, betrays a very different kind of experience to that which obtains in this country.

A second question on which we turn for information to M. Fonssagrives' work relates to the part which water, fouled

in certain fashions, may have in the dissemination of particular diseases. On this question he writes with no uncertain ton. He entertains fully the doctrines commonly held in England the subject, and quotes much English experience in support this views.

A third question to which we now turn, more from curiosit as an etiological question, than from any practical important which at present attaches to it, relates to Pettenkofer's views the variation of the level of the subsoil water in reference to the prevalence of certain diseases. These views are briefly referred to by M. Fonssagrives, and it is to be inferred, from what says, that they have not impressed him so strongly as they have impressed many English hygienists. He observes:—

"The theory of Pettenkofer agrees with many facts, but it is not in account with many others. It is a question, observe, of a veritable tide in the waters of the sub-soil, of which the flow and ebb are marked by the rise and fall of the level of the wells. This is a very general and constant condition to produce effects so special and of such great rarity." (P. 222.)

We commend M. Fonssigraves' work to our readers.



AUGUST, 1874.

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Original Communications.

PSORIASIS OF THE TONGUE.

BY W. FAIRLIE CLARKE.

n psoriasis of the tongue is applied in common medical to many different morbid conditions. I have often rprised at observing the confusion which prevails upon ject. It arises, I apprehend, from the mischievous habit erring the names by which we distinguish the diseases tissue to those of another. There are such differences the minute anatomy of the skin and of the mucous ne-more particularly such a mucous membrane as that overs the tongue—that we should be very slow in transhe names given to the morbid states of the one to those ther. If we do this without sufficient caution, we are le to be misled by false analogies. My object in this paper w to what exact class of tongue diseases, if to any, the riasis ought to be limited, and to what morbid conditions oplicable, and where, therefore, it ought to be superseded more appropriate name. I have known cases of fissured of superficially inflamed tongues, and of tylotic (or ic) tongues, all styled psoriasis. In fact, it would seem en anything is amiss with the mucosa of the tongue, KXIV.

persons fly to that name as if there were no other. In a recent article in the Archives Générales de Médecine, Dr. Deboue discusses what he calls the buccal psoriasis, by which he means the disease which has usually been termed in this country ichthyosis, but which, in my opinion, might with more propriety be called tylosis. As it is very important that we should avoid confusion, I am desirous of pointing out why I think the term psoriasis is a bad one and ought to be rejected in favour of another which is not open to the same objections.

Dr. Deboue uses, as I have said, the term psoriasis to signify the disease which has been called among us ichthyosis ever since attention was drawn to it by Mr. Hulke in 1864. is characterised by white patches, more or less elevated, on the surface of the tongue and buccal mucosa. The description of the disease given by Dr. Deboue is sufficiently correct, and there can be no doubt as to the morbid condition to which he intends to apply the term. But he, very properly, as I think, rejects the name ichthyosis. Neither on pathological nor on clinical grounds is it applicable to the disease in question. Ichthyosis of the skin, both in its milder and in its more severe forms, is always associated with a derangement of the sebaceous secretion and of the perspiratory function. These are essential parts of the pathology of the disease. Hence, as Dr. Tilbury Fox has remarked, ichthyosis of the tongue is an impossible condition. But the clinical differences are as marked as the pathological Ichthyosis of the skin is a congenital disease. A few rare exceptions do not invalidate this broad truth; and it remains substantially the same from first to last. Treatment may cause some amendment, but cannot cure it; and it has no inherent tendency to become worse. It never assumes a malignant character. But in all these points it is strongly contrasted with ichthyosis linguæ. This is never congenital. I have never seen a case before the age of puberty. And it has a decided proclivity to become cancerous; so much so, that some writers do not hesitate to regard it as an early stage of epithelioma. For these reasons I have decided against the name ichthyosis. ought to be at once and entirely discarded, and the name tylosis substituted in its place. The French medical writers appear to have always seen the objections to the name ichthyosis, and accordingly they have never used it in speaking of the disease. But they have fallen into almost as great an error in styling it psoriasis. The analogies with psoriasis are hardly greater than its analogies with ichthyosis. In order to bring out this point, let us ask what are the characters, pathological and clinical, of psoriasis of the skin?

Psoriasis, according as the term is used by dermatologists in its strict sense, means a disease of the cuticle: a deviation from the healthy nutrition of the epithelial layers. This may sometimes, in aggravated cases, be attended by some degree of enlargement of the papillæ. But the disease goes no deeper. One result of this morbid nutrition is the desquamation of the cuticle, which falls off in scales, and leaves reddish patches beneath. The same thing then occurs on a neighbouring spot. and then again on another, and so the disease continues. far this coincides with tylosis we shall see presently. of the skin is sometimes a congenital affection; sometimes it comes on in early life, sometimes in later years. Sometimes it is easily cured; sometimes it is so obstinate that it has acquired the name Psoriasis inveterata. But, however intractable it may be, it never passes on to become anything else or anything worse than psoriasis. The cracks and fissures which accompany the more severe cases never assume a malignant character. But when we come to compare this with tylosis, we shall see that here there are great and important differences.

Pathologically, tylosis is characterised by the retention and accumulation of the epithelial scales, rather than by their desquamation; so much so, that hard, raised, corny or warty patches are a leading feature of the disease. Sometimes these can only be detached by using considerable force, and when they do come off the subjacent tissues are found red and raw; and a patch thus affected neverwholly recovers. In psoriasis of the skin, on the contrary, when desquamation takes place, young and healthy epithelium may be found beneath, which, under appropriate treatment, may form a healthy skin. A lingual or a buccal mucous membrane from which patches of tylosis have been thrown off never returns to a thoroughly natural condition: it remains red, raw and swollen, and at the best is a source of much discomfort to the patient. But it is fortunate if discomfort

is all that he has to complain of. All severe cases, if not all cases absolutely, have a strong tendency to become cancerous, and will certainly develop into epithelioma if the patient lives long enough.

Now, is it desirable to call this disease, which we know as tylosis, psoriasis? Is it any better than calling it ichthyosis? In appropriateness there is not much to choose between the two names. One is almost as unsuitable as the other, and fo: very much the same reasons. Neither pathologically no: clinically is the disease which Dr. Deboue and the Frence 1 writers call *Psoriasis buccal* analogous to the psoriasis of derma tologists. Where, then, is the wisdom of transferring the nanafrom one to the other? Is medical language so poor that cannot find another term to express another condition? As have elsewhere said, I think we could not do better than ado Dr. Ullmann's name and call the disease tylosis. That is the term that I have adopted after considering all that have been suggested. The name, derived from the Greek τύλος, a callosity only points to one of the main features of the disease—the superficial hardness; a feature which is obvious to all, and which does not imply any analogies, true or false. Dr. Tilbury Fox has proposed that the disease should be called keratosis, but my objection to this name is that only a very small proportion of the cases present anything like a horny hardness. I formerly thought that the name papilloma would convey the most correct idea of its nature and relations. But I am not now disposed to press that name, because, though the disease sometimes begins as a small warty growth, yet it always has a great tendency to spread, and occasionally it commences in a diffuse form, and covers from the first a wide area.

For these reasons I have not continued to use the name papilloma, and prefer "tylosis," which I hold to be on the whole the safest name that has yet been suggested for the disease.

I am, as I have intimated, no advocate for transferring the names of skin diseases to the pathology of mucous membranes. It is a practice which is very apt to mislead. But as I find the term psoriasis given to various morbid conditions of the tongue, I have been anxious to try and fix its meaning precisely, and to show to what class of cases it ought to be restricted.

In my treatise on the diseases of the tongue I have pointed out that there is a small group of cases to which the name psoriasis may not inappropriately be applied. have many points of analogy with the psoriasis of dermatologists, and do not differ from that disease in any very notable particular. They are of this nature:—A patch of the mucosa becomes whitish, opalescent, and slightly thickened. There is hyperæmia of the papillary structures, with exudation into the epithelial layers. It is as if the spot had been lightly pencilled with nitrate of silver. But this appearance is not persistent, as in tylosis: it soon passes away. In a few days the patch desquamates; the epithelial layers of the mucosa fall off, and a red, raw surface, studded with prominent papillæ, is left. In a short time, with traordinary rapidity, the epithelium is re-formed upon this Pot, and no trace of disease can be discovered, even on the most nute inspection. But the same process repeats itself either Pon the same patch or upon an adjacent one; and so the ease goes on. If left to itself, it may run on indefinitely: appropriate treatment is adopted, it is easily cured; but it is ery apt to recur. It is, in fact, a troublesome though not a angerous affection. Both pathologically and clinically it has Dany features in common with the psoriasis of dermatologists; nd to this group, in my opinion, the term Psoriasis lingua ought to be restricted. It is a rare affection of the tongue rarer, a good deal, according to my experience, than tylosis; and 1t is not, as some have thought, an early form of tylosis and a step towards it. The two diseases are totally distinct, both Pathologically and clinically. In this limited sense, Psoriasis linguæ is seen chiefly in middle-aged persons, who are otherwise in tolerable health; and it is usually, if not always, associated with syphilis.

It is not my intention, in this paper, to discuss the etiology or treatment of tylosis. Upon these points I am in the main agreed with Dr. Deboue. My object was to consider the correctness of the name psoriasis as applied to tylotic conditions of the buccal mucous membrane, and to try and show cause for adhering to the name which was formerly given by Dr. Ullmann.

ON THE ACTION OF STIMULANTS.

BY JAMES ROSS, M.D., WATERFOOT, NEAR MANCHESTER.

STIMULANT is a term derived from the Latin Stimulus, which meant a goad for driving cattle or slaves, and was appropriated by the physiologist, in the first instance, to designate the agents which determine muscular fibre to contract. The action of a stimulant, therefore, depends upon two factors: the one is the nature of the agent which acts as a stimulant, and the other the properties of the tissue which undergoes the stimulation. Of these, the latter is far the most important for the understand.

The term irritability, which is now employed to designate 2 fundamental property of all living tissues, was originally used by Glisson as a name for the power of contraction possessed by muscular fibre on the application of a stimulus. This idea w more fully developed by Haller, who conducted a variety of experiments to determine the laws of the irritability or ves insita. But besides the vis insita, Haller supposed that muscl was possessed of two other powers: the second was the ordinary elasticity which it possessed in common with other animal fibres, both dead and living; and the third was the vis nervosa, by means of which the voluntary muscles are made to contract by stimuli applied to their nerves. The term sensibility, or vis nervosa, was not, however, long employed in this restricted sense, but soon came to be applied to the power a nerve possesses of undergoing a physical change on the application of the agents which call forth its functional activity.

^{1 &}quot;Halleri Primæ Lincæ Physiologiæ," § 400 et seg.

Hence at this time the body was supposed to be endowed with two fundamental properties, sensibility and irritability, and these were supposed to be acted upon by two sets of agents, those which acted upon the irritability being alone called stimulants. Cullen, however, perceived that there was no essential difference between these two sets of agents; hence he generalised them, and called all stimulants, no matter whether they act upon muscular fibre or upon nervous tissue. "The idea annexed to the term stimulant," says Cullen, "is that of a power suited only to excite the action of moving fibres; but I am here to consider stimulants more generally, as exciting the motive of the living principle, whether producing sensation or as producing the action of moving fibres." 1 Here we have an anomaly. The existence in the living body of two fundamental powers is recognised; while the agents which determine those into activity are regarded as essentially the same. Brown put an end to this anomaly. He generalised the powers as Cullen did the agents, and merged the sensibility and irritability into the one power of excitability. It is perfectly true that many hints of this generalisation are to be found in the writings of Cullen, but it is no less true that Brown was the first to give it articulate expression. I cannot at present trace the prolific literature to which Brown's conception gave rise, nor criticise the defects of the system he erected upon it. What I wish more particularly to notice is, that the predominance which the nervous system had attained in the medical theories of Cullen and Brown had the effect of transferring the term stimulant to those agents which excite nervous tissue to action; although it was originally restricted to the agents which acted upon muscular fibre. the case became still worse when the term began to be used by the general public; so that in the present day by stimulants are meant only those intoxicating agents which are used as beverages at our tables. My aim is to bring the term back to the meaning attached to it by Cullen, only modified and extended by the light of the progress made in the theory of irritability since his time.

Recent researches have shown that it is not muscular fibre alone which contracts on the application of stimuli, but that

¹ Cullen's "Materia Medica," vol. ii. p. 107.

almost every living tissue at some time or other of its existence is possessed of the same power. This is notably the case with pus cells, white-blood and lymph corpuscles; and indeed with all young masses of protoplasm, whether animal or vegetal. But contraction does not occur in all cases on the application of a stimulus to a living tissue. Gland cells secrete, and the nervous substance is not accompanied in its action by sensible change Future researches may show that even in the case of nerve and gland cells, display of function is associated with change of form; but in the meantime it is impossible to put contractility in the definition of irritability without excluding from it nerve and gland cells. In that case the great generalism tion of Brown would be lost sight of. It is, therefore, necessar; to compare the special kinds of protoplasm which constitut the active part of nerve and gland cells, with contractil protoplasm, and frame our definition of irritability in such Professor Rutherfor manner as to include both kinds. definition, although by no means free from objections, is as go as any I have seen. "I consider," he says, "that a tissue irritable if when irritated it evolve energy." 1 Dr. Burdon Sanderson's definition is substantially the same. Irritability according to him, "the property possessed by every livix structure whatsoever, of being excited to action (i.e. of havin its stored up force discharged) by some motion or disturbanc from outside." 2 Stimuli or stimulants are, therefore, thos agents which determine the living tissues to energise, no matter what the form of evolved energy may be, whether it be heat, electricity, secretion, growth, nerve force, or contraction.

Let us now attend for a moment to the laws of the irritability. The degree of the irritability depends upon the proneness of the molecules of the tissue to energise. Hence, when a small stimulus determines the tissue to energise, the irritability is high, and when a comparatively large stimulus is required to bring about the same result, the irritability is low; and when no energy is evolved on the application of a comparatively large stimulus under suitable conditions, the irritability is annihilated. Everyone knows that cold lowers the irritability; while heat,

¹ Lancet, January 21, 1871, p. 76.

³ Nature, June 18, 1874, p. 127.

on the other hand, if gradually applied, raises it. But if heat is suddenly applied, the tissue evolves energy; and if the heat is beyond a certain intensity, there is a transient evolution of energy, and the irritability is destroyed. Similarly with regard to galvanism. A small current does not appreciably affect a nerve; a larger current increases the irritability, and a still Mechanical stimuli follow a similar law stronger destroys it. in their action. If the end of a nerve is pinched, the muscle attached contracts, but a second pinch produces no effect, showing that the irritability is destroyed. If the chest of an animal is opened immediately after respiration has by some means been made to cease, the heart is found to beat for some time; but if it is irritated by the point of a needle, two or three powerful contractions ensue, and it ceases to beat—the irritability is destroyed. Chemical stimuli also conform to the same rule. Strychnia at first increases the irritability of the excito-motor nerve-cells or fibres of the spinal cord; but if the action is contin ued it then diminishes, and lastly destroys it. The stage of excitement of anæsthetics, inebriants, and narcotics is well recognised, and indeed the difficulty is to name any internal ^agent employed as a medicine which does not in the first stage of its action stimulate one or other of the tissues of the body to increased activity, even if it ends by destroying its irritability. It may be said that curara is an example of a drug that directly destroys the irritability of the motor nerves without producing a first stage of increased irritability. But the experiments of Bernard prove that this is not the case. The language which Bernard employs with regard to curara is so remarkable that it deserves to be quoted at length.1

"En effet, si vous donnez une faible dose de curare à un animal, vous verrez dans les premiers moments les nerfs moteurs, quoique tenant encore à la moëlle épinière, devenir plus sensibles aux courants galvaniques, s'il fallait, à l'état normal, un courant de 10 degrés pour exciter la contraction, il suffira dès lors d'un courant de 8, 7, ou 6 degrés; mais bientôt ce mouvement ascendant s'arrête, l'excitabilité de nerf baisse, revient graduellement à l'état primitif tombe au-dessous de lui et finit par

^{1 &}quot;Leçons sur les effets des Substances toxiques et médicamentouses." Par M. Claude Bernard, p. 220.

s'éteindre complétement. On pourrait représenter graphiquement cette progression par une courbe qui s'élèverait d'abord audessus d'une ligne horizontale, représentant l'état normal ou le point de départ, retomberait ensuite à son niveau et s'abaisserait ensuite indéfiniment jusqu'à zéro, c'est-à-dire jusqu'à disposition complète des propriétés nerveuses."

And when, a few pages further on, Bernard comes to deal with the general question, his words are so very striking, that even at the risk of being tedious, I shall quote them also in full.¹

"Nous avons étudié précédemment l'action des agents excitants, toxiques ou médicamenteux sur les nerfs, à l'état sain comme à l'état pathologique, et nous avons vu que l'exaltation de leurs propriétés spéciales est le premier effet qui se manifeste. Le curare lui-même, dont l'action tend à paralyser complétement le nerf moteur, commence par exalter ses propriétés; de telle sorte que si l'on pouvait suspendre l'action du poison, et maintenir le nerf dans l'état où il se trouve au début de l'expérience, on obtiendrait des effets diamétralement opposés à ceux qui doivent se produire définitivement. C'est là une particularité qui paraît commune aux actions d'un grand nombre de substances. Pourrait-on expliquer ainsi comment l'opium pris à faible doses, est un excitant très-énergique, tandis qu' à forte dose il est stupéfiant; et pourrait-on étendre ces considérations aux médicaments dont les effets, à doses fractionnées, diffèrent de ceux qu'ils produisent à fortes doses?"

It is not possible to give a full and satisfactory answer to Bernard's questions; but it is possible to answer them in a general way. If, for instance, we watch under the microscope the movements which an amœba executes by contractions of its substance, it is evident that these are signs of work performed or energy generated. And if there is any truth in physics better ascertained than another, it is that energy generated must be equal to tension consumed; and that tension consumed represents matter either in molecule or in mass becoming more closely aggregated, or falling from an unstable to a stable condition. But the store of energy in protoplasm is not inexhaustible, and the only condition on which the amœba of our illustration

¹ Op. cit p. 224.

1 continue its movements is, that the molecules after their I be raised again to their previous unstable condition; or, if t themselves raised, be replaced by others already in a state unstable equilibrium. This is equally true, whether the olecular change which takes place is one of isomeric change of decomposition. By way of illustration let me imagine alf a dozen books about the same size to be placed on their nds in a row; and let the distance between each be half the ength of a book. If a mechanical stimulus is applied to the ook at one end of the row in such a manner as to push its entre of gravity beyond its base, the tension of gravity will act pon it so as to make it fall towards the ground; but on meeting he second book in its fall, a similar motion will be comunicated to the latter, which will fall in its turn, and comnunicate a similar motion to the third; and so on till all the ooks have fallen, overlapping each other, to a condition of table equilibrium. When this condition is reached the energy f the system is exhausted, and the original stimulus cannot suse any further appreciable movement; and the only conition upon which a similar motion could be evoked by similar leans is, that the books be raised again on end, or replaced F others already on end. In either case an equivalent amount energy to that given out during the fall of our books must expended, either directly or indirectly, before they resume eir previous unstable position. Similarly with regard to When a stimulus determines it to energise, though the store may not be immediately exhausted as in the se of the books of our illustration, yet it soon becomes hausted unless the store is being constantly renovated from thout; and if the stimulus is so powerful as to exhaust the Tre of energy almost instantly, the irritability of the tissue U be destroyed. The destruction, however, must in all cases preceded by an evolution of energy in some form, however Insient may be its manifestation. But in health the active sues should manifest continued function; and not merely ve out a violent and momentary action to be followed by tire cessation of function; and this orderly display of function esupposes not only expenditure of energy, but constant neval of the energy so expended. The healthy irritability of a tissue, therefore, depends upon a condition of equilibrium between the expenditure of energy in function and the renewal of that energy from the environment. But since the energy cannot be renewed unless it is previously expended, expenditure within narrow limits is necessary to the maintenance of the life of the tissue, and within those limits stimulants are beneficial; but if pushed beyond the limit in which expenditure is met by renewal, they must be injurious, and their use in medicine beyond that limit can only be warranted where any special purpose is to be gained, as in the use of anæsthetics during operations.

But the truth upon which I wish to insist more particularly at present is independent of explanations and hypotheses. Careful observation shows that by far the greater number of the agents used as medicines act first by stimulating one or other of the tissues of the body to expend energy in some form; and when this action is continued, the second effect is to incapacitate the tissue for further action. This relation between the first and second stage of the action of stimulants was noticed by Cullen, who called the primary effect "the stimulant action," and the secondary "the stage of collapse." called the first "the stage of excitement," and the second that of "indirect debility." The condition induced by the withdrawal of the ordinary stimuli, such as the application of cold, was called by him "direct debility." Hahnemann called the two stages respectively the "primitive effect" and the "secondary effect, or reaction." But although this law is acknowledged by various writers, both past and present (and no one insists upon it more forcibly that the distinguished French physiologist, M. Claude Bernard), yet it is not commonly recognised in its full significance and generality. The maxim that effects are proportional to their causes is frequently assumed to be applicable to stimulants and their effects. The real maxim, however, is, in Sir John Herschel's words, "proportionality of the effect to its cause in all cases of direct and unimpeded action." But the action of a stimulant is neither direct nor unimpeded. mechanical stimulus, for instance, determines a tissue to energise over a much larger extent than at the point of contact; therefore the action is not direct. In the case of internal stimuli the

effect is still less direct. It depends upon the nature of the tissue affected, its blood supply, the rapidity with which the drug is absorbed into and eliminated from the blood, and upon many other co-operating factors, factors which do not keep constant for a moment of time in any one case, not to speak of the variations which must occur in different cases. the action is not unimpeded, since the effect depends much more upon the reaction of the tissue than upon the nature and degree of the stimulant. It is almost as reasonable to expect proportionality between a stimulant and the effect which follows its employment, as between the momentum of a bullet and the spark which has ignited the gunpowder. The degree of the stimulant used and the effect produced do, indeed, increase and decrease simultaneously; but even this indefinite relation only holds true within certain very narrow limits. We ought, therefore, to be extremely careful in inferring that because a certain dose of a medicine produces a particular action, an increase or decrease of the dose will produce corresponding variations of the effect. And the inference can only have even a probability in its favour when it is extended to adjacent cases; that is, when the variation made in the dose is very small, while the condition of the tissue to be affected remains nearly constant. Yet, obvious as this truth may appear, it is frequently lost sight of in many of our arguments with regard to the action of The following are examples:—A tablespoonful of medicines. wine every four hours is doing good in this case of fever—the pulse is stronger; but, being still weak, if we double the wine we shall double the result. Four ounces of wine did good in our last case of fever; but in this case the debility is, so far as can be judged, double; hence eight ounces will be required. In this case of syphilis small doses of mercury are doing good; therefore, if the administration of the drug is pushed to the poisonous limit, the disease will to a certainty be One grain of calomel and half a grain of opium given every four hours in acute peritonitis is beneficial; but in this case the symptoms are most pressing and urgent, therefore, two grains of calomel and one of opium must be given every two hours. If these arguments were always expressed in distinct formulæ, their falsity would be recognised by all; but

although they are not openly expressed, the maxim which underlies them is tacitly assumed in many of our therapeutic reasonings. The treatment of violent peritonitis by two grains of calomel and one of opium to be taken every two hours is not an imaginary case. I was forced by a consultant, many years ago, much against my own judgment, to adopt this treatment in The case was not promising for any treatment. such a case. My diagnosis was that it was caused by some grave accident in the third month of pregnancy in a case of extra-uterine feetation. My consultant, however, refused to enter upon any refinements of diagnosis. One thing was clear—the case was one of most violent peritonitis, and as practical men the disease must be combated. So far as I could read the workings of his mind (he did not and could not assert experience in favour of the treatment), his argument was—an ordinary case of acute peritonitis is best treated by a certain dose of calomel and opium; but this case is quadrupled in its violence, therefore we must quadruple the dose of the remedy. I do not assert that the argument was ever formulated so distinctly in his mind. Our mode of treatment in such emergencies is generally reached at a bound, and it is only by a careful subsequent mental analysis that the different steps through which the conclusion was reached can be recovered: and it is very probable that my consultant never bothered himself with such an analysis, although he was in the main a good and practised physician. I need scarcely add that this treatment did no good—our case ended fatally two days after the consultation; but as vomiting was most persistent from the first, I had at least the satisfaction of believing that the result would not have been different under any other treatment.

But it is not the busy practitioner alone who requires to be reminded of the hazard of inferring from the effect of a certain dose to that of another dose of the same drug. Erroneous inferences of this kind may be found in the writings of instructed physiologists. I will adduce the famed experiments undertaken to determine the nature of the action of mercury upon the secretion of bile as examples. The question to be determined was:—Has mercury any stimulant action, either direct or indirect, upon the tissue which secretes bile? The degree of

the irritability of the tissue must in this instance be inferred from the *indirect* evidence afforded by the quantity of bile secreted in a given time, and not, as in the case of muscle, from the *direct* evidence afforded by the facility with which it can be made to contract by a galvanic current of definite intensity. And as the evidence in the former case is more *indirect* than in the latter, the conclusions drawn from it must be less reliable in a corresponding degree.

The details of the experiments of "The Edinburgh Committee on the action of Mercury" are too well known to require mention here. And no one who has read the report but must admire the wonderful ingenuity and perseverance with which all the practical difficulties were surmounted by the experi-After having established a biliary fistula, and surmounted various other difficulties in Dog No. 1, the quantity of bile secreted during six consecutive days was carefully collected and weighed in order to determine the normal secre-The administration of mercury was commenced on July "Five grains of pilula hydrargyri were given as one dose daily during eight days; the pill was always given twenty-four hours previously to the collection of the bile." 1 After detailing the experiment the reporter proceeds: "The administration of the drug was accompanied by slight diminution of fluid bile secreted, and a slight augmentation in the average quantity of bile-solids." He then adds: "On July 14, more fluid and solid bile was secreted under the influence of blue pill than had been secreted on any day without it; but as a counterpart to this, it can be said that on July 17 the amount of fluid and solid bile was less than it had been on any previous day." 2 One would think that this experiment, if taken by itself, plainly shows that blue pill had stimulated, either directly or indirectly. the bile-secreting tissue. This conclusion is warranted, not merely because there is a slight increase in the average quantity of bile solids secreted during the six days, but much more because there is a distinct indication of a curve, such as is described by Bernard in the case of curara, which rises first beyond the normal variations, and subsequently sinks below them. There is, in short, a distinct indication of a primary

¹ British Medical Journal, May 8, 1869, p. 414.

² Ibid.

increase and a secondary decrease of function, such as is produced by other stimulants upon other tissues. But this is not the view adopted by the reporter. The augmented flow on the 14th is, in his opinion, counterbalanced by the diminished flow on the 17th; and the former is quietly disposed of as being of no significance. A subsequent experiment undertaken with the same dog also points to a primary increase in the flow of bile; but as a large quantity of bile was secreted by the kidneys, the result was inconclusive. The next experiment, in which an increased flow of bile comes prominently forward, is in the case of Dog No. 5. After the fistula was established and the preliminary observations made, "twenty-four hours previously to the collection of the bile on the 29th, ten grains of blue pill were administered. During the succeeding three days ten grains of calomel were given daily in one dose, on each occasion twenty-four hours previously to the bile collection." After detailing the result the reporter adds: "The high amount which the fluid bile attained when ten grains of blue pill were given might be supposed to indicate an increase in the secretion." But the solid constituents of the bile, which in the reporter's opinion are the most important parts (a fact which is quietly passed over in the case of Dog No. 1), were diminished; and he thinks that this at once disposes of the inference which might otherwise be made from the augmentation of the fluid part. But notwithstanding the diminution of the bile solids, the great increase of the fluid is a very suggestive fact, especially when taken in connection with the primary increase of all the constituents in Dog No. 1; consequently an experimentum crucis requires to be made to determine whether this augmentation is really due to the action of mercury. "In another dog, No. 7, ten grains of blue pill were given on one day, and fifteen grains on the following day." 2 "The bile was lost on the day that the first dose of blue pill was given," but on the next and subsequent days there was a diminution in all the constituents of the bile secreted. The result of this experiment settled the question to the reporter's satisfaction. The primary increase in the quantity of bile in the cases of Dogs No. 1 and No. 5 could not have been caused by the action of the

¹ British Medical Journal, May 8, 1869, p. 415.

mercury. What assumption underlies and gives validity to this conclusion? Putting Dog No. 5 out of the question in the meantime, the inference cannot be extended to Dog No. 1 unless it be true that because ten grains of blue pill diminishes the flow of bile, five grains cannot augment it. In short, throughout the whole argument of the reporter there underlies the assumption, that because a large quantity of the drug either does not increase or diminishes the quantity of bile, à fortiori a small dose cannot augment its flow. Suppose that Bernard had adopted a parallel course when investigating the action of curara, what would have been his conclusion? Let us suppose that he administered a small dose of the drug to a frog, and that while testing its effect on the motor nerves half an hour afterwards—(from the rapidity with which it acts, half an hour in the case of curara would probably be equal to a day in that of mercury)—he found, contrary to his expectations, a marked increase of their irritability. In order to determine whether this increase is caused by the curara, let us assume that he doubled the dose in his next experiment, and on applying his test at the end of half an hour, still found slight but doubtful signs of increased irritability. This last experiment, however, on being repeated with another frog, showed the irritability at the end of half an hour diminished and becoming less and less Such a result might very until it was finally annihilated. readily be obtained if the absorption of the drug in the third frog were a little more rapid than in the second. If Bernard were now to conclude that because the comparatively large dose of curara employed in the third experiment did not produce an increase of the irritability at the end of half an hour, therefore the small dose employed in the first case could not have been the cause of the increase found, he would only be making a similar inference to that made by the Edinburgh Committee in the case of mercury. But the method adopted by Bernard was almost exactly the opposite of the one here sketched out. Instead of increasing the dose given to the first frog, he diminished it still further, and applied his galvanic test earlier than at the end of half an hour. By this method he established, as already mentioned, that the primary effect of a feeble dose of curara is to increase the irritability of the motor nerves.

the inferences of the reporter of the Edinburgh Committee from the experiments are vitiated by the neglect of the relation which subsists between the primary and secondary action of a drug, and the opposite effects produced by large and small doses. To my mind, the facts that a strong dose of curara destroys the irritability of the motor nerves while a feeble dose increases it, that a strong dose of alcohol stupifies the brain while a small dose excites it, and that this relation is found to exist between large and small doses of stimulants of all orders, afford good presumptive evidence that since large doses of mercury diminished the biliary secretion, small doses will be found to increase its flow.

ON "REST" IN THE TREATMENT OF CHEST AFFECTIONS.

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(Continued from p. 450.)

HTHISIS.—Whatever measures can contribute in any way to successful treatment of cases of what we call "pulmonary isis," deserve our most earnest attention, for we need y available help in combating this very grave class of It becomes, therefore, a matter of considerable gent to determine whether we can derive any assistance 1 rest, and if so, by what methods it can be brought about, for what purposes it is applicable. To these questions esire to devote the last paper of this series; but while ing opinions to which I have been led as the result of tical and experimental study, I cannot help feeling that subject needs much more extended inquiry than it has yet ived, before positive conclusions can be arrived at: and I ld urge upon those who have opportunities of treating isis on a large scale, that they should join in the investigawhich it is by no means improbable might lead to very

tantial results.

It is the clearly understood at the outset what is included in the term "pulmonary phthisis" in a pathological point iew. Some high authorities still hold to the opinion that the

lary morbid change in all cases is the formation of tubercle lie lungs, as the result of the local development of a con-

stitutional diathesis, which tubercle subsequently breaks down, involving the destruction of the pulmonary tissue. observed, too, that some who write about phthisis allude to its pathology in a vague kind of way, as if they were not at all clear about its origin. The idea which seems to prevail also among the members of the profession generally is, that phthisis is always a constitutional, tubercular affection, and they appear afraid of giving up this notion. Now I wish to state here very definitely and clearly my opinions on this matter, as they have a bearing upon the subsequent remarks. Without going the length of agreeing with all that Niemeyer has affirmed, a tolerably extensive experience has thoroughly convinced me of the following facts:—1. That pulmonary phthisis is, in a large number of cases, entirely local in its origin, having nothing whatever to do with tubercle or with any constitutional taint. 2. That in many instances where tubercle is found in the lungs at the post-mortem examination, it is the result of local irritation or local infection, due to some pre-existing morbid condi-3. That where the formation of tubercle is the primary morbid condition, much of the subsequent destruction of the lung-tissue is the result of the inflammatory products to which it gives rise by its irritation. Were phthisis, in its commencement and progress, invariably a local manifestation of a constitutional disease, the advantages of rest would certainly be very limited; but granting it to be a local affection in a good proportion of cases, and this is much more likely to become an important element in its treatment.

Before proceeding to consider what methods of procuring rest are applicable in the management of phthisis, and what they may be expected to accomplish, I feel constrained to offer my emphatic protest against the view advanced by Dr. Dobell, that one object to be aimed at is to limit the respiratory functions, in order to diminish the amount of oxygen entering the system, on the hypothesis that "tuberculisation is peroxidation of albuminoid tissue." As I have already stated, I believe—nay, I am sure—that in many cases phthisis has nothing whatever to do with tubercle, and even where the disease has this origin, it seems to me that any idea of interfering with the consumption of oxygen is a most mischievous one. It would be an evil day

for phthisical patients if the notion prevailed among practitioners that their duty is, under any circumstances, to deprive them of oxygen; indeed, numbers of them suffer from this very deprivation at present, and if more attention were paid to procuring for them plenty of pure, highly oxygenated air to breathe, the better would it be for their well-being. I certainly do not agree with the opposite view, which makes air overcharged with the products of respiration always answerable for the development of phthisis, but I do think that those who entertain it are more likely to be guided to the true principles of treatment of this formidable disease.

The questions relating to the advantages to be derived from rest in the treatment of phthisis, either preventive or curative, may be discussed under certain headings.

1. General rest of the body, and restriction of the respiratory functions.—In every case of established phthisis, and also where there is a predisposition to this disease, it is of much consequence to determine carefully whether it is desirable for the patient to take exercise or not, and if so, to give as definite instructions as circumstances permit or require, with regard to the kind and amount to be indulged in, and particularly as to the degree to which the respiratory organs are to be called into action. But too commonly this matter is ignored altogether. while in other cases indiscriminate exercise is ordered, and that not seldom of a violent kind, where the indications point decidedly in the direction of rest; or, on the other hand, a patient is kept in the house or in bed who would be much the better for some out-door exercise. On this point each case must be considered on its own merits, but there are certain general indications which may, I think, be taken as guides, to which I will now briefly direct attention, first referring to those cases in which there is merely a danger of phthisis becoming developed; and, secondly, to those in which it actually exists.

While holding to the *local* origin of phthisis in a good proportion of cases, I do not for one moment question its *constitutional* origin in many of them, and it is about those cases in which there is a supposed constitutional tendency to consumption, either hereditary or acquired, that I wish to speak here. In the first place, wherever there is at all a marked hereditary

predisposition to phthisis, if circumstances permit, it is very desirable that the person thus predisposed should be intelligently guided in the matter of exercise, as well as with regard to other measures having reference to the maintenance of health, especially during the period of growth and development. This does not mean that we should always be laying down positive and exact rules as to what must and what must not be done, but merely that we should exercise a general supervision over these patients. Taking the bulk of individuals hereditarily predisposed to phthisis, it may be stated as a general rule that they are quite capable of taking a fair amount of ordinary exercise, such as walking or riding, and need it too, while they are certainly the better for being out of doors and inhaling as much fresh pure air as they can get. If these patients are evidently delicate and weakly, the amount of exercise must be limited to suit their capabilities, and it is this class of patients who chiefly need to be guided.

Now there are two opposite errors which are often committed in the cases at present under consideration, and which need to be guarded against. On the one hand, these patients not uncommonly suffer from deficient exercise, especially during the periods of youth and adolescence. Their friends are, in not a few instances, under the impression that they are too delicate to undergo any exertion, and indulge them in idle, enervating habits, which are decidedly injurious to them. This is particularly likely to happen if the patients themselves feel languid and are easily fatigued by a little effort, their sensations being but too readily accepted as a correct indication of what they need in the way of exercise. Indeed, experience has taught me that it is no easy matter to make people comprehend the essential importance of out-door exercise in many cases of this kind, but when they do carry out the advice they usually soon recognise its advantages. Then, again, many persons predisposed to phthisis are seriously injured from want of exercise in connection with their occupation. I do think that a great deal more consideration should be given to the finding of suitable employments for such persons than is customary, not only with reference to exercise, but also to other sanitary matters. What can be expected, when they are made to follow some calling which keeps them confined to a room or office for twelve or more hours daily, deprived of all out-door exercise, and generally surrounded by anything but satisfactory hygienic conditions, but that the constitutional disease will manifest itself, especially if this happens at a tender and critical period of their life? Yet this is a true representation of the case of many of the patients with a hereditary tendency to phthisis, who present themselves in hospital and private practice. I say emphatically, therefore, that if such a state of things comes under the notice of a practitioner, one of his first duties is to insist upon an immediate change to some more satisfactory employment.

The other mistake which calls for notice tends in a contrary direction to that just considered. It is not unfrequently the custom to recommend patients predisposed to consumption to practise various exercises with the view of expanding their To do this without proper discrimination is decidedly wrong and may lead to very serious consequences. lent exercises which bring the lungs into forcible play, such as running, rowing, gymnastics, &c., are dangerous in such subjects, even when they are apparently strong and well, but especially if at all delicate, and therefore need to be indulged in cautiously. Not a few cases have come under my notice in which active disease seemed to have originated in a rupture of a blood-vessel in the lungs produced in this way. Then, again, most of these persons have chests of very fair size, which do not particularly require to be enlarged. If all forms of the disease are included, my experience at Brompton Hospital has taught me that the great majority of phthisical patients can compare not unfavourably with other individuals as regards the shape and dimensions of their chests, and this is true also of a large proportion even of cases of constitutional origin. do not, however, by any means intend to imply by these remarks that all persons exhibiting any predisposition to phthisis must be prohibited from all exercises of this kind. often beneficial, if indulged in moderately and with care, and if the chest should be small in any person, whether predisposed to consumption or not, various methods for expanding it may be employed with much advantage, especially in early life, provided they are carried out judiciously. Among other methods, I think a useful and safe one is to instruct the

patient to go through a process of deep breathing for from two to five minutes every morning and evening, inspiring and expiring forcibly from twelve to fifteen times in a minute.

Coming now to those cases in which there is actual pulmonary mischief, I remark first that under such circumstances all forms of violent exertion, but especially such as call the lungs into undue play, are decidedly to be avoided, as they are liable to lead to serious harm. On the other hand, the great majority of cases of phthisis are improved by more or less walking exercise, not too vigorous, provided the conditions of climate and weather are suitable. The exact amount of such exercise to be recommended must be guided by the local and general conditions observed in each patient. When they can be indulged in, quiet riding and driving are beneficial, the latter being also very useful for those who cannot take active exercise. I am sure that many phthisical patients are injured by being kept too much at rest and indoors, or at least they are not sufficiently encouraged to go out and walk. The want of out-door exercise is one reason why the progress of many consumptive patients who go into general hospitals is anything but satisfactory. One great advantage also of sending such patients to the more genial climates is, that it enables them to go out, when otherwise they would be obliged to remain in the house. There are conditions. however, in which it becomes very important either to limit the amount of exercise considerably, or even to enjoin perfect rest for a time. Thus, exercise must be restricted if the disease is extensive or spreading rapidly; if it is decidedly of a tubercular nature; if there is a disposition to much pyrexia; and especially if, with either of the above conditions, any little exertion brings on much dyspnœa, cough, or hæmoptysis, or causes much sweating with a sense of great debility and fatigue. I particularly wish, however, to draw attention here to those cases which have a more or less acute origin. I believe it is extremely important that in any case beginning in this way, whether due to pneumonia, catarrh. tubercle, or whatever else it may be, the patient ought to be kept completely at rest, or even confined to bed. Not a few cases go from bad to worse, either because they are not able to take the needed rest in the early stage of the disease, or because they are not instructed to do so. Hence it is a great advantage to get patients into hospital at this stage, where they can be kept at rest and at the same time receive proper treatment of other kinds. Rest is also imperatively called for if hæmoptysis of any amount occurs, whether there is actual disease in the lungs or not, and even though the patient present no constitutional tendency to phthisis. It is also important if in the course of a case acute exacerbations should arise.

2. The conditions of the air breathed.—There can be no doubt but that some forms of phthisis are directly due to the habitual inhalation of air of irritating quality, especially such as holds solid particles in suspension. In a less degree it has an influence in the causation of very many other cases, as when patients are obliged to work in confined and impure atmospheres, or are exposed to cold and damp. It is obvious that when such a case comes under treatment, the first thing to be done is to remove the patient at once from conditions which are so evidently injurious, and thus give the lungs the rest which they need from the constant irritation to which they are exposed. If this is not done, not only is a cure impossible, but the disease Unfortunately patients are often must necessarily progress. prevented by circumstances from acting upon this advice, but still it should be urged as one of the most important elements in the treatment of such cases.

The effect of any kind of irritating atmosphere in exciting cough must also not be forgotten. Many phthisical patients complain that when they go out into a cold and damp or foggy atmosphere, their cough becomes very severe, and of course they should be warned against exposing themselves to these evident causes of irritation. If circumstances compel them to do so, they should wear respirators. The same applies to every condition in which the air is likely to cause irritation.

3. Suppression of cough and other violent actions connected with the respiratory organs.—Space will not permit me at present to enter upon my reasons for making the statement, but I have a strong belief that cough, especially if severe and long-continued, may be the immediate cause of pulmonary phthisis, no matter what such cough may be due to, even though it is only the result of some irritation in the throat. Hence it is, in my

opinion, of great importance not to allow cough to continue for any length of time, however trivial the cause may appear to be. This applies to all individuals, but especially to those who are predisposed to consumption. Should the cough be associated with some evident pulmonary complaint, even if it is only a little bronchial catarrh, and particularly if the apices of the lungs are affected, the checking of long-continued cough is still more important. When phthisis is actually developed, the management of this symptom is often a matter of much difficulty. It becomes a question whether and how far it is desirable to restrain it, but it may be laid down as a general rule, that if the cough goes beyond what is necessary for getting rid of the materials formed in the lungs, it ought to be checked, and especially if it is of an irritating character, and comes on in severe, irrepressible It may then do a great deal of harm if allowed to continue, by tending to increase the mischief in the lungs; by causing serious vomiting of food; by exhausting and weakening the patient very much; or by leading to some direct lesion in the lungs, such as the rupture of a blood-vessel or the bursting of a cavity with consequent pneumothorax.

It is beyond the province of this paper to allude to all the remedies which may be used to relieve cough. In practice it is often found by no means an easy matter, and one has to vary the measures employed very frequently. Various anodynes and sedatives are of course useful, especially morphia in small doses. I would draw special attention, however, to the necessity of always looking to the state of the throat and larynx, as some cause of irritation is often found here; and also of instructing the patients not to force themselves to cough, as many of them are in the habit of doing, with the view of bringing up the phlegm.

As regards other actions in which the lungs are unduly exercised, such as speaking in public, singing, &c., it is only necessary to say that these ought to be forbidden if the lungs are actually diseased, or if there is evident danger of their becoming affected.

4. Applications of mechanical apparatus over the chest-walls, with the view of procuring local rest.—It is to this particular mode of giving rest to diseased lung-tissue that Drs. Berkhart,

Dobell, and M'Crea of Belfast have alluded in their papers on the subject, and I desire to add the results of my own observations in the same direction. That this mode of treatment is very valuable in certain cases and for certain purposes, anyone who practises it will soon find out. And I would remark, by the way, how difficult it is to impress upon many minds the advantages of simple, common-sense measures, however obvious these may be. This seems to me to be a measure coming under this category, but very few take much notice of it. I strongly urge, therefore, upon all practitioners, that at least they should not ignore it altogether because of its simplicity, but see whether it may not be of some service to them in the treatment of cases which are anything but easy to manage as a rule.

Beginning with the form of apparatus to be employed, I think that every advantage which can be expected may be derived from strapping the chest with strips of some plaster spread on a firm material. There are positive objections to the use of any elaborate form of "lung-splint," and I do not think such an instrument is at all needed. The plan I adopt is very much like that described under "Pleurisy," except that it is only desirable to apply the plasters over a limited portion of the chest, and that in most cases it is the upper part which has to be fixed. When this is required, I practise a plan very similar to that described by Dr. M'Crea in this week's Lancet (July 18), passing vertical strips firmly over the shoulder from behind forwards, and others round the side. The differences are, that I use broader strips; apply those round the side, some obliquely, crossing each other, others horizontally; and if there is any marked depression above or below the clavicle, I fix pads of cotton-wool in the hollows, beneath the plasters.

Let us now consider for what purposes and in what conditions this form of treatment may be of service. First, it may be employed with the view of promoting curative changes, and preventing the spread of the morbid process to healthy portions of the lungs. For this purpose it is particularly serviceable in those cases where the disease is limited to one apex, especially if it is of a chronic nature, or if curative changes have commenced and are advancing. Thus I feel sure that in several cases where a cavity at one apex has begun to contract, the

healing process has been aided by the use of plasters. So, too, when acute pneumonia involving the apex of one lung has originated phthisical destruction, I have found the same application beneficial, as well as in a few exceptional instances where this disease has led to the same result at one base. both apices are affected, the application may be safely made to one of them, and sometimes with advantage, especially if the healing process has commenced there, and if the disease does not appear to be making progress. As a general rule it may be stated, that the more evidently the lung-disease is of local origin; the more limited it is; and the more clearly it appears that all active mischief has ceased and that curative changes are going on, the better is the prospect from the use of mechanical applications to the chest as a means of cure, or of prevention of further extension of disease. If the complaint is decidedly tubercular and constitutional; if it shows signs of spreading rapidly; if there is extensive disseminated disease through one lung, or à fortiori through both, but little, if anything, can be expected from these applications for the objects above mentioned.

For the relief of certain symptoms, however, these appliances are even more valuable, and may be employed much more frequently, than as a means of cure, being, indeed, for this purpose permissible in almost any case. Above all they are most useful in relieving the pains about the chest and sidesparticularly the latter-from which consumptive patients so often suffer, due either to local pleurisy or to injury to the muscles from severe cough, the application being made over the seat of pain. These are almost invariably got rid of at once if the plasters are properly applied, and at the same time the patient can cough and breathe with much more comfort, and feels an agreeable sense of support. This treatment is especially serviceable in this way in the case of those who are obliged to work. Undoubtedly, also, it has an influence in checking cough, and in preventing hæmoptysis, where this symptom is Indirectly it has thus a beneficial of frequent occurrence. effect on the general symptoms, sometimes very striking.

I have never seen any ill effects from strapping the chest in phthisical cases, nor can I see any particular danger from practising this treatment, lest some other portions of the lungs should be involved on account of extra work thrown upon them, provided the application is not made too extensively. In some cases it may be advisable to keep the patients at rest for a time while the treatment is carried on, so as to make but little call upon the respiratory functions.

There are several points in this paper on which I should have liked to write more fully, had space permitted. conclusion I will sum up briefly what I believe to be the only ways in which any mode of rest can be expected to be serviceable in the treatment of phthisis. 1. By keeping the lungs at rest, more or less generally or locally, disease may be prevented, its spread checked, and its cure promoted where it has already developed. 2. Possibly, by diminishing the flow of blood through the lungs, active mischief may be to some extent checked. 3. By looking to the conditions of the air inhaled, any irritation from this source may be prevented. 4. Local symptoms may be considerably relieved, and untoward accidents, such as rupture of a vessel, averted. 5. General destruction of tissue may be prevented, by making but little call on the patient's efforts, and this is a matter of considerable importance in some cases.

NOTE ON HYDROPHOBIA.

BY HENRY MACCORMAC, M.D., BELFAST.

MALE dogs are oftener affected with hydrophobia than females. because they fight much oftener and bite each other more frequently. If dogs were not allowed to run at large they could neither bite nor fight, and there would be little, perhaps no hydrophobia. It would be only humane to try and exempt these poor animals, our dependants, from hydrophobia. But the motive is immensely enhanced when we consider that if hydrophobia did not take place in dogs, neither would it take place in human beings. With proper isolation and care, dogs would be comparatively, if not entirely, exempt from hydrophobia. is indeed no sufficient reason why they should labour under it The dog, indeed, does not necessarily incur hydrophobia more than other animals. If dogs were not permitted to fight and bite, hydrophobia, in any case, could not spread among them. At the present moment, while the great majority of dogs are quite exempt from canine lues, there is a residuum, actually or potentially, labouring under hydrophobia. As matters stand, this residuum is certain, or almost certain, to propagate the disease. The method which the dog pursues is by inocula-Prevent the inoculation, and you prevent the disease.

Next to preventing hydrophobia, the important thing would be to remedy the malady when it has ensued. But this, hitherto, no one has succeeded in doing. People have recovered from most forms of poisoning, but from hydrophobia never. Looking at the malady, however, from another point of view than that of direct medication, an idea has occurred to me. It is this, If only we can maintain the powers of life, prevent them from sinking utterly, the poison, speaking of poisons in general, haply is eliminated, and the sufferer is bound to recover. That this conjecture is not entirely unsupported, will appear from the following instances. In repeated examples of poisoning from alcohol, and some from opium, by sustaining the powers and hindering utter collapse, even when the surface and extremities were cold and the pulse was imperceptible or hardly perceptible, I have thus averted death and ensured eventual recovery. repeated instances of poisonous snake-bite in America, and also in Australia, the administration of alcohol to the verge of intoxication, if not beyond, has ensured recovery; that is to say, the sufferers would, short of this course, presumably have perished The action of ammonia, as introduced into the veins, though somewhat equivocal, has also, in like instances, been attended with recovery. In the case of the curara poison the action of the respiratory organs is suspended and the patient dies. But if only artificial respiration be continued for a certain period, the poison is eliminated and the subject recovers.

Now, it seems to me that if only in hydrophobia the patient could be kept for a little while alive under somewhat more favourable conditions, the poison would also be eliminated, and the sufferer perhaps recover. Mais le moyen de parvener, how is this to be accomplished? If we survey the victim to hydrophobia, we find that he labours from excessive thirst. This thirst he has no means of appeasing, since, if he attempt to drink, frightful spasms and even death itself are superinduced. The sufferer, therefore, does not drink, and he finally sinks. In the healthy human organism three pounds of fluid are required daily. It appears to me, then, that if only the thirst could be quenched the subject of this most terrible malady, of which I have witnessed some sad examples, might also perhaps recover. In short, water daily to the requisite amount might be injected into the veins or into the rectum. The requisite apparatus could be kept in a contiguous chamber. Spasms, I assume, would not be at least thus induced, time haply might be gained, the poison possibly would be eliminated, and the patient, otherwise sustained by various resorts, might eventually escape death.

PHYSIOLOGICAL AND THERAPEUTICAL RESEARCHES ON THE MONOBROMIDE OF CAMPHOR.

BY DR. BOURNEVILLE,

Laureate of the Paris School of Medicine, Editor of "Le Progrès Médical" of Paris, &c. &c.

The monobromide of camphor, C¹⁰HO¹⁶Br, derived from bromide of camphor, C¹⁰H¹⁶OBr² is a white, solid substance, presenting the form of rather long transparent prisms, with a slight smell of bromine and a marked one of camphor.¹ The specimens used for my experiments were furnished me by Dr. Clin, and prepared by M. Silva, Professor of Chemistry at the École Centrale of Arts and Manufactures. The following researches, which I will relate as briefly as possible, are divided into two parts: the first relating to the study of some points of the physiological action of monobromide of camphor, the second to its therapeutical properties.

I. Physiology.

My experiments were conducted on guinea-pigs, rabbits, and cats. Until now, I have always administered the substance in hypodermic injections. After some searching I was able to find out a solution which, whilst it was sufficient for keeping perfectly the substance in the dissolved state, has not seemed to occasion abscess.² The formula is thus: Monobromide of

³ My first solutions, containing a stronger proportion of alcohol, often produced small abscesses.

¹ See article "Camphor" by A. Naquet, in "Dictionnaire de Chimie pure et appliquée" de M. le Professeur Wurtz.

amphor, 3 grammes (45 grains); alcohol, 35 grammes (about 9 lrachms); glycerine, 22 grammes (5½ drachms).

Circulation.—On auscultating at repeated intervals an animal guinea-pig, cat, &c.) into which monobromide of camphor has been injected, modification of the number of the heart's beatings is soon detected. Their number is diminished, and the diminution is proportionate to the dose injected. Weak doses (such as about 1 grain) produce a diminution of from 15 to 20 pulsations (guinea-pigs). A stronger dose (4 grains) caused, in an hour and a half, the beatings of the heart in a guinea-pig to descend from 192 to 103. In another one, 6 grains in four hours' time caused a fall of 160 to 108. In a third one, there was a decrease of 28 pulsations.

Still stronger doses naturally produced more marked effects: grains brought on, in seven hours, a decrease of 68 pulsations 1 a young cat which survived. Ten grains injected into same it, which died this time, brought down the pulse from 200 to 16. In a guinea-pig, weighing about one pound, 5 grains in n hours brought down the cardiac pulse from 168 to 72.1 ig. 1 (Exp. I.) shows a decrease of 160 to 116. note another experiment, in a stronger cat (Fig. 2, Exp. III.), I Jected 12 grains of monobromide of camphor. The beatings the heart, in 58 hours, fell from 188 to 80. The cat died. n not one of the animals experimented on have I noticed the lightest irregularity in the heart's beatings. Whenever I Examined the state of the auricular vessels, in all three sorts of inimals, I always found indubitable narrowing of the calibre of the larger blood-vessels, with disappearance of the secondary arborizations, &c. Lastly, I noticed a remarkable paleness of the palpebral conjunctive of a rabbit which had received 9 grains of monobromide of camphor into its skin.

Respiration.—Respiration, like circulation, is diminished. The curves which can be traced are, however, somewhat less egular than those of the pulse and temperature, as occasionally he number of inspirations, after having fallen to 48, may rise > 52 and 56, and then diminish again. The following is a immary of some of my observations.

(1) Cat; 5 grains of monobromide of camphor: the respira
This diminution only once failed to occur.

tion fell from 60 to 44 in an hour. (2) Guinea-pig; $7\frac{1}{2}$ grains the respiration was brought down successively, in four hours to 44, 32, and 16. (3) Cat; 10 grains: the respiration, which was 70 at the outset, came down to 28 in the space of eight hours. (4) Cat; 12 grains: the respiration was brought down in fifty-eight hours from 70 to 16. (5) Guinea-pig, weighing one pound; $5\frac{1}{2}$ grains: in six hours the respiration came down from 72 to 18. (6) Cat, weighing about two-and-a-half pounds; 13 grains: the respiration in forty-eight hours fell from 84 to 48.

Besides diminution in the frequency of respiration, I have noticed in some cases, at an advanced period of intoxication, a kind of waving during inspiration, which, in other words seemed to be effected in intervals. There never was a appearance of dyspnea. Whilst becoming more and more in frequent respiration was always regular. Besides, except on post-mortem which showed the existence of various patch of pulmonary apoplexy, all the others testified to the perfect integrity of the respiratory organs.

Temperature.—My experiments in this respect must divided into two groups: the first includes the experiments which monobromide of camphor was administered in weak middling doses, not fatal; the second includes those in which strong doses occasioned death.

First Group.—Doses of 1 grain in several guinea-pigs, and of 2 grains in cats, gave me, in a great number of cases, a fall of temperature varying from 0.5 to 2.8 degrees (centigrade). In cats of different ages, weighing from one to three-and-a-half pounds, doses of from 3 to 7 grains of monobromide of camphor determined a fall of from 2 to 3 degrees. Amongst others, the following is a complete relation of an experiment.

EXPERIMENT I.—Young cat of five weeks. May 9. Temp. 37°.9. At 5 o'clock, injection of 8 grains of monobromide of camphor.—5.30: Pupils measure six millimetres transversely; temp. 36°.5.—5.45: temp. 36°.4.—6.20: No movement; temp. 36°.1—7.15: No salivation; no evacuations; temp. 35°.4; respiration 60. The animal drags itself along with difficulty.—8.45: P. 160; R. 60; T. 35°. Whenever the animal attempts to move it falls on one or the other side. Mewings, rare and weak. Pupils

are slightly dilated and are contractile.—10 o'clock: P. 116; T. 34°.—11 o'clock: The animal still drags itself with difficulty about. Two fæcal evacuations have taken place since 10 o'clock. T. 34°.5.

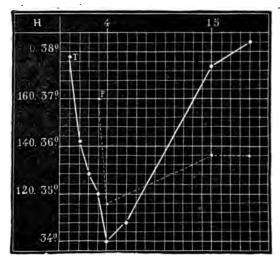


Fig. l.—н, hours. Each vertical line is equivalent to an hour. r, pulse;

May 10.—8.30: The animal has thrown up some food. It mews and is able to sit. Its hair bristles. Its gait is easier. The pupils measure about 3½ millimetres. P. 136; T. 37°.5.— 12 o'clock: The animal has had two convulsive attacks. P. ¹³⁶; T. 38°·2. From that date I witnessed several attacks characterised by the following features: stiffness of body, cries, then complete tonic rigidity, considerable dilatation of pupils. This stage lasted fifteen to twenty seconds. Then general clonic convulsions, of extreme violence, which occasionally throw up the head and push it forwards; lastly, micturition, attended or not by evacuation of fæcal matter; froth at the mouth; speedy enough return of the pupils to their normal state; muscular resolution; profound sleep. P. 142; T. 39°. A quarter of an hour after the attack, T. 38°3.—3.40: T. 38°6. fit.—Evening, 9.50: The cat has had eight or nine attacks. 39°6. Though the gait seems somewhat steadier, there is some uncertainty in the hind part of the body.—10 o'clock: Violent attack, attended by the same symptoms. Abundant urine, abundant froth at the mouth.

May 11.—9 o'clock: The animal, which had refused food yesterday, now drinks milk and eats meat. It also walks quite easily. T. 39°.—Evening: No attack; T. 39°. Hair fresh and smooth; gait natural.

May 13.—Animal as well as ever. T. 39°.

Fig. 1 indicates clearly the fall of temperature caused by monobromide of camphor. In four hours it was seen to descend from 37°9 to 34°. During the period corresponding with this fall, the frequency of the pulse diminished; its trace (P.) offers, consequently, the greatest analogy with that of the temperature. The animal is asleep, and when excited it can scarcely manage to make a few steps and it immediately falls asleep again as profoundly as before. This ensemble of phenomena is followed by another period, that of reaction, announced first of all by an increase of temperature, which in the space of about fifteen hours returns to its primary figure. Whilst the fall of temperature is effected with rapidity, the subsequent ascent takes place with a certain degree of slowness, and is, moreover, accompanied by phenomena to which I will revert after having described the facts belonging to the second group.

Second Group.—It includes, as I have already said, the experiments which ended in death. They may be divided themselves into two series. In the first, the accidents were comparatively slow, in this respect, that a more or less slight tendency to recovery was manifested; whilst in the second, the accidents took a rapid course. This distinction has a real importance, respecting at least the experiments made upon cats, as the symptoms were quite different in the two cases.

1. In a cat of five or six weeks, into which 10 grains of monobromide of camphor were injected, the temperature was previously 39°·1; forty-three hours after the injection it had fallen to 31°·8. The animal died two hours after. The temperature at the time was not noted, but obviously it must have decreased still more. In twenty-seven hours the pulse descended from 200 to 116. A curious particularity must be noted. Nineteen hours after the injection, the temperature was 29°·8. During

ne fourteen subsequent hours it went up to 33°·2; lastly, the all began again, and two hours before death it was 31°·8. It rould seem from the above that at a certain moment of the ntoxication there was a kind of struggle, and that in the end he depressing action of the substance was the stronger. The hermometric trace and the same fall of pulse and respiration are observed in guinea-pigs. The following, for instance, is a very illustrative résumé.

EXPERIMENT II.—Large guinea-pig. The cardiac pulsations, reckoned several times from May 16 to 18, varied from 192 to 176. The temperature was 38.9 and 38.7. On May 18, 7½ grains of monobromide of camphor were injected.

Hours.							Temperature.	Pulse.	Respiration.	
15 m. 50 m. 1 h. 50 m. 2 h. 50 m. 3 h. 40 m. 4 h. 30 m. 4 h. 53 m. 14 h. 17 h. 30 m. 20 h. 30 m.	50 m. ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,	;; ;; ;; ;; ;;					:	38° 37°.5 34°.6 33°.8 33°.4 35°.4 35°.4 35°.5 36°.2 34°.5	176 156 140 132 124 — 130 136 140 152	44 40 20 16 — 32 —

The animal was found dead a few hours later, and unfortunately it was not possible to go on stating the temperature till the end. However, we find here the same thermometric phases as in the cat above. In four hours and a half, the temperature fell from 38°·7 to 33°; the pulse from 192 to 124; the number of inspirations went down to 16. At this moment there supervened a tendency to reaction, during which we see the temperature go up again to 32°, the pulse to 140, and respiration to 32. But the reaction did not last, and after twenty-two hours of effort the animal got worse, the temperature fell again, and the thing lied. Another experiment, which I must relate in extenso, furnished results confirming in every respect those which I have not described.

EXPERIMENT III.—Cat of three months, weighing about one ound and a half. June 10.—T. 38°8. Pupils somewhat dilated.

—2.10: Injection of 12 grains monobromide.—2.20: T. 38°4; P. 188; R. 70. The animal dozes already, and does not move when auscultated. It mews on being pinched. Pupils less dilated.—3 o'clock: T. 37°8; P. 164. The cat drags itself along and falls at every step. The hind part seems weaker than the fore. Some mewings. Evacuation of fæcal matter.—3.30: T. 37°5; P. 168; R. 50. Pupils still less dilated than just now. After having mewed, and made some resistance on the thermometer being introduced, the animal seems quite collapsed. On being loosened (set free) it remains stretched out on its back, with its legs extended and pupils closed. No salivation, no tremulousness.

4.30: T. 36°·2; P. 176. The cat has just had an attack characterised by plaintive cries, clonic movements of the paws as if they were beating a drum, and of the head, which turned alternately from right to left and left to right, and extreme dilatation of the pupils. At the end of the attack the animal fell asleep. 7.30: T. 35°·1.—8.30 and 9 o'clock: T. 35°·2; P. 160. Convulsions in the muscles of the jaws. The animal stretches itself out and draws in its tongue, whilst the eyelids are open and the pupils are dilated. Except during the fits, there is complete flaccidity and quiet sleep. No salivation, no vomiting, no evacuation of feecal matter.

10.30: T. 34°8; P. 156; R. 54.—11.30: T. 34°6; P. 148; R. 50. Same absolute immobility. No tremulousness.—Midnight: Pupils still exceedingly dilated. T. 34°2; P. 144; R. 50. June 11.—7.30: T. 33°2.—8.30: T. 32°9; P. 120, regular; R. 36, waving-like. Pupils slightly dilated.—9 o'clock: T. 32°6.—12 o'clock: T. 32°2; P. 120; R. 20.—1 P.M.: T. 32°4; P. 124; R. 28.—2 P.M.: T. 32°2.—3 P.M.: T. 32°; P. 140; R. 28. Voluntary movements and mewings on being examined. Same complete inertness. Pupils scarcely dilated. No tremulousness. Weight, 940 grammes (36 less than at the beginning of the experiment).—4 o'clock: T. 32°4; P. 132; R. 24.—10 o'clock: T. 32°4; P. 136; R. 26.

Midnight.—The animal has had several fits, during which it was turned sideways, whilst occasionally it was entirely doubled up. From 11.50 to midnight, it had two passages of bloody urine.

June 12.—8 o'clock: T. 33°·7; P. 154.; R. 28.—12 o'clock: T. 33°·4. The animal struggles when the temperature is taken. 3 o'clock: T. 34°·3.—4 o'clock: T. 34°·6.—5 o'clock: T. 34°·2.—6 o'clock: T. 33°·4.—7 o'clock: T. 32°·4.—10.30: T. 28°·7.—Midnight: T. 27°·2; P. 82; R. 16.

June 13.—8 o'clock: T. 22°·2. On introducing the thermometer the animal makes an effort to stand, executes a few movements with its paws, and utters some smothered cries. Exhausted by the effort, the animal sinks, and again falls asleep. Slight stiffness of paws. Contraction of the jaws, which it is rather difficult to open. Pupils moderately dilated motionless; sinking of the cornea. No evacuation. 9 o'clock: T. 22°·6.

12 o'clock: T. 21°.7.—Since this morning, it is impossible to reckon the beatings of the heart and the inspirations, as the sounds are exceedingly dull and rare.—1 o'clock: a few instants before death and immediately after, T. 21°.7 (temperature of the room 21°). From 12 to 1 P.M. the animal had occasional convulsive shocks. It was able to lift up its head when the thermometer was introduced.

Post-mortem.—The subcutaneous cellular tissue of the abdominal wall is slightly infiltrated with serum. To the right side, in the situation of one of the punctures there is slight vascularisation. The encephalic pia mater and the encephalon are not injected. Left lung, pale; right lung, normal. The auricles contain some black clots. The liver, spleen, stomach, small intestine, large bowel, and kidneys show no lesions. The bladder is healthy and contains about a teaspoonful of clear, citrine urine, containing no albumen.

Under the influence of an injection of 12 grains of monobromide of camphor, the temperature in this case fell from 38°8 to 21°7, showing a decrease of 17°1 in seventy-one hours, during which the phenomena lasted. Here again we witness a rather rapid thermometric fall (38°8 to 32° in twenty-four hours), then a very moderate elevation (32° to 34°6), effected laboriously and with great slowness (twenty-five hours), and by a series of short ascents arrested by slight descents; lastly, after these alternatives, the temperature falls decidedly and regularly, and in twenty-four hours descends from 34°6 to 21°.7.

There could be no doubt as to the reality of this last figure, noted twice, as I left the thermometer, deeply introduced, more than a quarter of an hour. Besides, had it not been for the convulsive movements which took place at distant intervals, and, amongst others, a raising of the head accompanied by plaintive mewings, one would have thought that the animal

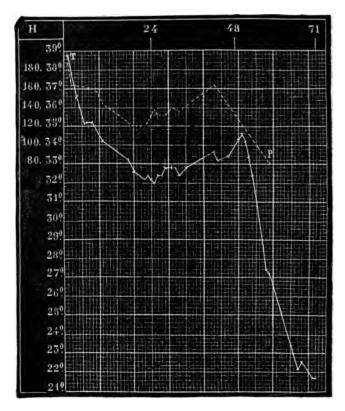


Fig. 2.—H, hours; T, temperature; P, pulse. Each vertical line is equivalent to an hour. Duration of the phenomena, 71 hours.

had ceased to live. The pulse and respiration, in this case, underwent the same influence as did the temperature, ascending and descending just like this latter.

2. In all the experiments of the first series of this group, intoxication was low, and at a certain period the temperature was seen to rise more or less (Fig. 2) and then to fall again.

When, as in the following experiments, the dose of monobromide of camphor was more considerable, the frustrated (failing) reaction which is attended in cats by convulsive accidents, is totally wanting.

The following experiments are highly illustrative.

A guinea-pig, weighing 515 grammes, was subjected to the influence of 5½ grains of monobromide of camphor. Before the injection: Rectal temperature, 29°2; P. 100; R. 18. Ten hours after: R. T. 26°; P. 72. Five hours after this first examination, the animal was found dead and already quite stiff. In this case the fall of temperature was continuous and regular, without the slightest ascending oscillation.

EXPERIMENT IV.—Young cat, weighing 1,265 grammes. Before the injection: Rectal temperature, 40°.5; R. 84. Injection of 13 grains of monobromide of camphor. Ten minutes after the operation: R. T. 39°. 35 minutes after: The blood-vessels of the ears are scarcely apparent. Immobility. P. regular (132); R. 96, irregular, and taking place in four or five respirations separated by a somewhat long interval of rest; R. T. 37°.8. Pinching of the toes of the hind paws determines a withdrawal of the paws with a plaintive mewing. Tickling of the nose produces no reaction; tickling of the soft palate causes a movement of deglutition.

1.15: Slight evacuations of fæcal matter; no urine. No tremulousness. Pupils very dilated. R. T. 36°6; R. 72, regular, P. 124.—2.15: auricular vessels no longer perceptible; complete immobility and flaccidity. R. T. 35°6; R. 36.—3.15: Same complete torpor. R. T. 34°. Pupils dilated.—4.15: R. T. 33°1. Pinching of the toes, tail, &c. occasions no movement. No tremulousness, no vomiting, no fæcal evacuations, no urine.—5.15: The animal died a few minutes after. The pupils were dilated to the last. Fifteen minutes after death: R. T. 31°6.

Post-mortem.—The pia mater of the encephalon is somewhat notably injected, that of the brain more so than that of the cerebellum. The cerebral substance, the spinal pia mater, and the cord appear to the naked eye perfectly healthy. There was some blood, fluid or clotted, in the ears. All the other organs were perfectly healthy.

All my experiments, as may be seen, show that mono-

bromide of camphor exerts an energetic action on temperature, and that this action increases in proportion to the dose injected. They show that with middling doses, or strong, slowly-poisoning doses, there exists a period of struggle, announced by the rise of temperature. When recovery is to

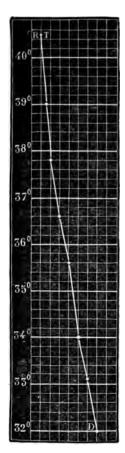


Fig. 3.—RT, rectal temperature; D, death.

take place, this elevation continues, and, in a space of time always longer than that of the period of descent, it remounts to the initial figure (Fig. 1). When, on the contrary, the animal is to die (second group, first series), the elevation takes place by jerks, and after having attained only a comparatively low figure, it is again superseded by a rapid and continuous fall (Fig. 2). Lastly, in the cases belonging to the second category of the second group (Exp. IV. for instance), where the doses are very strong, the temperature, from the time of the injection to that of death, follows a regularly descending course (Fig. 3). To conclude, I may remark, that on examining the animal with the hand, the external surface of the animal's body gives a feeling of cold, but which gives no idea of the fall of central temperature.

Digestive Functions; Secretions.—Under the influence of weak doses (2 grs.) administered daily during eight, ten days, &c. (as those which I gave with the object of studying tolerance of the drug), the animals lose their appetite. After

middling doses given at once, the appetite returns, generally in the space of two days.

But whatever may be the strength of the dose, weak, middling, or great, I never once observed vomiting (cats). Evacuation of fæcal matter, though not suppressed, is less active. Salivation does not seem modified. Urinary secretion seemed rather lessened; but this point requires further investigation.

Nervous System.—Of all the phenomena produced on the ervous system the most striking is that which concerns the ypnotic properties of monobromide of camphor. Even in eak doses (2 or 3 grs.) monobromide of camphor determines ach profound sleep in guinea-pigs, that these little animals, rell known for their fearfulness, remain perfectly motionless and do not utter the slightest cry when attempts are made to darm them. Very generally they betake themselves to some corner, where they lie still till the toxic effects are dissipated, and then they reassume their normal gait. The same phenomena are noticed in cats, even those which have preserved a certain degree of wildness.

In stronger doses (4 and 6 grs.) the animal, cat, rabbit, or guinea-pig is still more profoundly set asleep. Instead of keeping on its legs, it lies prostrate, and when it attempts to walk it falls at every effort. During sleep it presents nodding movements of the head, which recall those of people sleeping in a sitting attitude.

Lastly, if the animal is under the influence of very strong doses, it is absolutely flabby and inert. When taken in the hand, it doubles up in the form of a half-circle, and were it not for the state of the heart and respiration, one would think it dead. These general considerations testify, therefore, in an indubitable manner, to the hypnotic properties of monobromide of camphor.

This remarkable sleep is accompanied by weakening of motility, which is more or less considerable according to the doses, and which may attain complete collapse and obtusion of general sensibility, without there being ever any exaggeration of reflex movements or any contracture. Monobromide of camphor would therefore act more particularly on the brain. I must not forget to mention, additionally, the dilatation of the pupils and he contraction of the blood-vessels of the ears and eyelids. Such are the principal facts which I derive from all my experiments.

There is also another sort of phenomena which deserves to be pecially mentioned,—I mean the convulsions. I have only bserved them in cats, in which animals they manifested themelves in special conditions. Thus (Exp. I.), the fits, which ere clearly epileptic, did not supervene during the first stage of intoxication (sleep, resolution, fall of temperature, &c.), but during the second, when the animal was doing better, sleep was diminishing, motility returning, and the temperature ascending,—in a word, during the period of reaction. The epileptic fits, which were very intense in the cats which recovered after the absorption of moderate doses, were, on the contrary, comparatively slight in those which, having received stronger doses, offered before dying that abortive reaction which I have described in Exp. III., and which coincided with a slight rise of temperature. These convulsions did not show themselves in cats which had received only weak doses (even when frequently repeated) nor in those which (as in Exp. IV.) had received very strong doses, bringing on regular and continuous fall of temperature.

Tolerance of the Drug and loss of Flesh. I have instituted some experiments with the object of elucidating these two points, and though they have not quite satisfied me, I think it fit to mention, in a summary manner, some of them, on account of the interest which this aspect of the question presents with reference to the therapeutical applications to which these researches are intended to serve as an introduction.

EXPERIMENT IV.—Large and robust guinea-pig. From May 11 to May 20, daily injection of 2 grs. of bromide of camphor. The pulse and temperature gave me the following results:—

```
1st day . . Fall of temperature, 1°.7
                                 10.8
2nd ,, . .
                 ,,
                                 20.3 Pulse descends to 140
3rd ,, . .
4th ,, . .
                                 1°8
                                                        144
                         ,,
5th ,, . .
                                 10.1
                                                        152
                 ,,
                         ,,
                                           ,,
6th ,, . .
                                 1°7
                                                        152
                         ,,
7th ,, . .
                                 10.4
                                                        152
                         ,,
                                           ,,
                                 00.9
8th ,,
                                                        148
                                 10.2
```

The temperature and pulse, considered on the whole, underwent only a slight modification from the outset to the end of the experiment. The animal became more and more torpid; it lost its appetite, and wasted away gradually. Lastly, the punctures were the starting-point of some local accidents, and the guinea-pig sank about ten days after the first injection, and the second day after the last one.

Into a young guinea-pig weighing 430 grammes, I injected uring three days 1½ grs. of monobromide of camphor. The following tabular statement shows the influence on temperature and weight:—

```
1st day . . Fall of temperature, 1°0
2nd ,, . . ,, ,, 1°1 Weight, 405 grammes.
3rd ,, . . ,, ,, 2°1 ,, 415 ,,
4th ,, . . ,, ,, 2° ,, 390 ,
5th ,, (no injection) — ,, 380 ,,
```

From the first injection the guinea-pig ate less and less, and, as may be seen from the weighings, lost flesh considerably. As to the fall of temperature, it went on increasing in this case, a fact which shows that the animal did not in the least get accustomed to the drug. Another guinea-pig furnished almost identical results as concerns the fall of temperature. In this case also the weight diminished perceptibly:—

```
Initial weight, 460 grammes.

2nd day . . . . . 435 grammes.
3rd ,, (no injection) 420 ,, 6th ,, . . . . . 390 ,, 4th ,, (injection) . 450 ,, 7th ,, (death) . . . 388 ,,
```

The comparative diminution of weight was 72 grammes in seven days: I say comparative, as we must take into account the fact that the animal was in its period of growth. Before any injection (from 3rd to 6th June) its weight, ascertained every day, was successively 410, 430, 450, and 460 grammes. If, therefore, to the 72 grammes which the animal lost during the experiment, we were to add the weight which it would have gained during the time, the total loss which it underwent would be, approximately, 120 grammes. I will conclude this paragraph with the following experiment.

EXPERIMENT V.—A young cat, weighing 815 grammes before my injection, received daily 2 grs. of monobromide of camphor. he temperature was noted every day immediately before the niection and fifteen minutes after:—

```
1st day . . Fall of temperature, 0°6 Weight, 815 grammes.
2nd,, . .
                                 0°·8
                                              790
3rd " . .
                                 00.9
                                              765
                 ,,
                         ,,
4th ,, .
                                 00.7
                                              748
                 ,,
                         ,,
                                                     ,,
5th.,,
                                 10.2
                                              748
```

```
6th day . . Fall of temperature, 0°3 Weight, 760 grammes.1
 7th ,, . .
                  ;,
                           ,,
8th ,, . .
                                                 705
                                          ,,
                  ,,
                           ,,
                                                        ,,
9th ,, . .
                                  00.6
                                                 665
                           ,,
10th ,, (no injection)
                                                 635
```

This fact seems to place beyond doubt that the same quantity of monobromide of camphor produces about the same effect on temperature. This already furnishes us with a valuable element for appreciating the degree of tolerance. On the other hand, the weighings show us that in nine days the animal lost 150 grammes of its weight. The appetite, which was preserved during the first six days, disappeared completely afterwards. Such as they are, these results seem to show that, on the one hand, tolerance of the drug is very slightly marked, if it at all exists; and that, on the other hand, the monobromide of camphor brings on in guinea-pigs and in cats a loss of flesh which, when the experimentation is carried on, soon occasions, in turn, a fatal termination.

Anatomical Lesions.—Except in two cases in which I observed a somewhat notable injection of the encephalic pia mater, I always found the brain and its integuments perfectly healthy. In the two cases quoted, the animals (guinea-pig and cat) had died rapidly under the influence of very strong doses. Moreover, in one of the cases (that of the guinea-pig) there existed patches of pulmonary apoplexy. Independently of these two cases, so to say, quite exceptional, all the organs were healthy.

From all my experiments, amounting to about forty, and which entitle me to attribute powerful sedative properties to monobromide of camphor, I believe I am justified in drawing the following deductions:—

1. Monobromide of camphor diminishes the number of beatings of the heart, and determines contraction of the blood-vessels of the ears and eyelids. 2. It diminishes the number of inspirations. 3. It lowers temperature in a regular and constant manner. In fatal cases the lowering increases till the end. In those which recover, the lowering is followed by an elevation of temperature, which returns to its initial figure, but in a longer time than that during which the lowering was effected. 4. Monobromide of

¹ The weight was taken later than usual, and after food.

camphor possesses undeniable hypnotic properties. It seems to act principally on the cerebral nervous system. 5. It does not seem that the medicament is got accustomed to; and its protracted use determines rather rapid loss of flesh in cats and guinea-pigs.

II. THERAPEUTICS.

If I am to trust to the result of my numerous researches on the subject, medical publications on the therapeutical employment of the compounds of camphor and of bromide have been until now exceedingly rare. The first by date seems to be that of M. Deneffe (of Ghent). In a short but very interesting paper, he announces that monobromide of camphor is "an excellent sedative of the nervous system," and in support of this he relates a case which I will briefly summarise.

Mr. N., age 38 years, addicted to drink since several years. When summoned to him, M. Deneffe described the following symptoms: Trembling of the fingers and hands, rendering writing difficult; extraordinary agitation; irrepressible requirement to move about from one place to another; very irritable character; malaise; prostration. Every evening there was an exacerbation of the symptoms. Sleep would not come, and Mr. N. would pass the long hours of the night tossing about in bed; it was only very late in the night that he could get a little sleep. Towards four o'clock in the morning the agitated anxious sleep would be suddenly broken, and the patient would jump up in bed, bathed in sweat and not knowing where he was. Delirious, fantastic conceptions then took possession of him; he would fancy himself on the top of a high mountain. and would feel himself suddenly rolling down an abyss; men and wild beasts pursued him. The room was full of unknown personages and animals, all more extraordinary the one than the other. And all this phantasmagoria, like a clouded sky, would change every minute, but constantly present the same hideous and alarming aspects. It was only on flying from bed that the patient could manage to get a little rest. The visions would then leave him, and, excepting the constant general

¹ On Monobromide of Camphor and its applications to Therapeutics. (*Presse Médicale Belge*, 1871, p. 405.)

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excitement, he was free from nightmares till the next day. Pulse frequent, excited; eye, shining; loquaciousness. Delirium tremens appears evident. Prescription: Take every hour a pill containing 3 grs. of monobromide of camphor.

The very next day, after having taken twenty of the pills, the patient was very much better. Excitement less; eye less shining; speech less rapid. The night had been better, and had been accompanied by less of nightmares and visions. During three days Mr. N. took 3 or 4 grammes (45 to 60 grains) in the shape of pills in the course of each twenty-four hours. The amendment became more and more marked every day; sleep came back, the visions and dreams disappeared entirely, and the tremulousness of the hand completely removed. During the eight days which followed recovery from these nervous phenomena, M. Deneffe continued the administration of the remedy in doses of from 20 to 45 grains daily. The recovery remained perfect.

Having had knowledge of the above case, Mr. W. A. Hammond (of New York) got some monobromide of camphor prepared by Professor Maisch of Philadelphia, and administered it to several patients. He thus sums up his opinion on the therapeutical advantages of this medicament:—

"My experience with the monobromide of camphor, though thus far limited, is eminently satisfactory. I have employed it in two cases of *infantile convulsions* due to the irritation of teething, with the effect in each instance of preventing the further occurrence of paroxysms which, previously to its administration, had been very frequent. In each case a grain was given every hour, rubbed up with a little mucilage of acacia. Three doses were sufficient in one case, and two in the other. The children were aged respectively fifteen and eighteen months.

"In a very obstinate case of hysteria occurring in a young married lady, in the form of paroxysms of weeping and laughing, alternating with epileptiform and choreiform convulsions, I gave the monobromide of camphor in doses of 4 grains every hour. The influence was distinctly perceived after two doses were taken, but ten were necessary to entirely break up the attack. This was a very favourable result, as all previous seizures had lasted for from five to eleven days uninfluenced

by medication or moral suasion. I have also employed it with excellent effect in several cases of headache occurring in women and young girls, and due to mental excitement and excessive study. One dose of 4 grains was generally sufficient to cut short the attack. In two cases, three doses at intervals of half an hour were necessary.¹

I will now succinctly relate the results, as yet incomplete, which I have obtained at the hospice of La Salpétrière, in the wards of my beloved master, Professor Charcot.

Insomnia. 1.—Mrs.——, age 62, affected with disease of the heart, and suffering from persistent sleeplessness. I gave her, at bed-time, one, and afterwards two pills, each containing 2 grains of monobromide of camphor. This small dose quite sufficed to produce sleep.

2. Mart. (Elizabeth), age 46.—Progressive Locomotor Ataxy. Insomnia alternating with sleep agitated by nightmares. She speaks aloud, cries out, &c., in her sleep. Under the influence of 6, then of 8 grains of monobromide of camphor, she slept much better, was more composed, and no longer waked up her companions in the ward.

I incline to believe that monobromide of camphor will be of great service in combating insomnia, especially that due to cerebral hyperæmia (W. H. Hammond); as at the post-mortem of the vast majority of animals which died slowly after strong doses, I have always found absence of congestion of the cerebro-spinal integuments, of the encephalon, and of the cord.

Paralysis Agitans.—I have begun giving the monobromide of camphor to three women affected since a long time with paralysis agitans. The only modification which I have observed until now consists in diminution of agitation and a slight increase of sleep.² Before knowing exactly what we must think of the action of the drug on tremulousness it is necessary to prolong the treatment during several weeks and increase the strength of the doses.

Chorea.—Mat. —, age 64. The disease first manifested itself

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¹ Note relative to the Monobromide of Camphor. New York Medical Journal, May 1872, p. 522.

² M. Charcot has insisted with care on the insomnia of these patients. Generally, they sleep only a few hours, and wait for daylight with impatience.

at the age of 40. Has been addicted to excess of drink and been incapable of any work from the age of 55. Walking has become impossible for a year past; agitation and horrid faces, continual. Every day she falls out of bed. Bad sleep. Though the patient has been taking pills of monobromide of camphor for only a fortnight, the restlessness has already considerably diminished. She sometimes will remain comparatively easy for fifteen or twenty minutes together. She no longer falls out of bed. In this case, as in the patients affected with paralysis agitans, therapeutical experiments must be carried on for some time; and, on account of the oldness of the affection, only more or less slight amendment can be expected. However, even at present, comparative calm has been the result.

Hystero-Epilepsy.—In these cases, as well as in the following ones, the treatment was commenced on April 22. I was not yet well acquainted with the medicament, I began with doses which were evidently too weak: 1 gr. during eight days, 2 grs. during six days, and so on; and I reached 16 grs. only on July 10. In such cases, I think it advisable to begin with four or five pills of 2 grs. each, making up 8 or 10 grs. daily, and to add 2 grs. to the dose every five days. The strongest dose which I have as yet prescribed is fifteen grains, but I believe it can be carried further. These preliminary statements were, I think, necessary to enable us to appreciate the results which I am going to analyse. As an element of comparison and appreciation I will describe the fits which took place during the two months which preceded treatment and during the two months in the course of which my patients took monobromide of camphor.

1. Lang, 18 years: March and April, five attacks; May and June two.—2. Bug, 23 years: March and April, eight fits of hystero-epilepsy, and sixty-three attacks of hysteria; May and June, seven attacks of hystero-epilepsy, and twenty attacks of hysteria. Notable amendment. The patient is much easier; works better and more constantly.

Epilepsy.—I must first of all state that I had to deal with very old-standing cases of epilepsy:—1. Ducre, 28 years: March, April, fourteen fits, six vertigos; May, June, twelve fits, four vertigos. Slight amendment.—2. Aub, 17 years: March, April,

five fits, eight vertigos; May, six fits, three vertigos; June, no fit, six vertigos.—3. Fouill, 12 years: March, April, five fits, 171 vertigos; May, June, six fits and 121 vertigos. In this case the giddiness only was amended.—4. Ray, 28 years: March, April, seventeen fits, three vertigos; May, June, ten fits, six vertigos. Fits amended.—5. Lob, 25 years: January to March, sixteen fits, forty-seven vertigos; April, May, and June, six fits and six vertigos. In this case the amendment seems very manifest. The above statistics, such as they are, point to a good result. They are only data, but sufficiently satisfactory to encourage the practitioner in using monobromide of camphor in epilepsy.

PHARMACOLOGY.—W. A. Hammond thus expresses himself:—
"The monobromide of camphor may be given in the form of pill, with confection of roses as the excipient, or as a mixture with mucilage of gum arabic and syrup. The dose for adults ranges from two to five grains."

I first administered the following pills:-

Monobromide of camphor, gr. ij.

Gum and sugar, q.s. for one pill.

From one to ten daily.

At present I make use of the following preparation, due to Dr. Clin, former house-surgeon to the Paris hospitals:—

Monobromide of camphor, gr. ij.

Sugar, q.s. for converting into dragées.

These dragées are nothing else but tiny pills, in which the medicament occupies the centre, whilst a coating of sugar preserves the substance from the contact of air, and on the other hand facilitates its administration to patients. They melt easily in the stomach.

These various preparations are readily taken by ordinary patients; but in some special affections, such as tetanus, epilepsy, hydrophobia, &c., they would not be convenient; so I have endeavoured to find out a solution which could be injected under the skin. The first solution that I made use of for my experiments had the inconvenience of producing abscess; but after some searching I was able to find out one which answers very well. It consists of monobromide of camphor 45 grs., alcohol 9 drachms, and glycerine $4\frac{1}{2}$ drachms.

After having made sure that it brought no local accidents in

animals, I made use of it in two aged epileptic patients. Each of them had already had six injections of from 40 to 55 drops, made either into the thighs or buttocks. Not the slightest accident has occurred. I believe I can therefore safely recommend its use. It is needless to add that the punctures must be watched over, and that no more than 30 or 40 drops should ever be injected into the same situation, especially as concerns children (hooping-cough, chorea, &c.)

Such are the present limits of my researches. I am fully aware of the shortcomings which they yet present; but I would be glad if the indications that I have been able to lay down were to lead other medical men to study the action of a drug which seems destined to do us some service.

Rebiews.

Surgical Emergencies, together with the emergencies attendant on Parturition and the treatment of Poisoning. A Manual for the use of general practitioners. By WILLIAM PAUL SWAIN, F.R.C.S., Surgeon to the Royal Albert Hospital, Devonport. London: Churchill.

This modest manual is intended to help the general practitioner on those various occasions when, especially if he resides in a remote rural district, he is apt to find that he is in a serious fix. Mr. W. P. Swain, already well known as a writer of original valuable surgical works, and as one of the leading operating surgeons in the West of England, does not pretend to originality in the volume before us. He has simply endeavoured to gather together, in small and handy space, items of information which the practitioner might otherwise have to search for in several quarters. No doubt there will be many country surgeons who in the future will thank Mr. Swain for the trouble he has taken to put them easily in possession of the kind of refresher of half-forgotten knowledge which is so welcome to those who find themselves pressed by anxious responsibilities.

Materia Medica and Therapeutics (Vegetable Kingdom), by Dr. CHARLES D. F. PHILLIPS (Churchill), reaches us too late for an adequate notice in our present number. On a future occasion we shall review this valuable work at some length.

Clinic of the Month.

Calibre of the Male Urethra.—Dr. Fessenden Otis gives a series of measurements, showing that the calibre of the male urethra is considerably greater than that which is ordinarily assigned to it. It is usually considered that the circumference of the male urethra is about one inch, and in accordance with this the largest sounds and catheters usually made do not exceed But several cases are on record in which calculi of larger circumference than this have been passed. Dr. Otis himself has an oxalate of lime calculus measuring $1\frac{1}{2}$ in. in its largest circumference and 14 in its smallest, and weighing 12 grains, which was passed by one of his patients without much inconvenience. He has found it practicable to introduce catheters having a circumference of 11 in., and even of 12, without lacerating the urethra, in cases where it appeared to be of normal size. This is a matter of importance in reference to the passage of small calculi by the urethra, or of fragments of larger ones which have been broken up. (Lancet, July 11.)

The local treatment of Cystitis in Women.—Dr. Braxton Hicks, in a paper read before the East Kent district of the S.E. branch, observes that in speaking of cystitis he means the more severe forms, such as that which, amongst other causes, arises from the effects of labour-retention, from malignant disease of the organ, or from paralysis, &c. General or constitutional remedies are in such cases of little service, but local treatment proves of great value. The only general treatment that may be used with advantage is opium or some other anodyne, and such corrective as may modify an alkaline state of the urine. Supposing it to be alkaline and ammoniacal, it is best to take a catheter made of gum elastic, and open at the extremity as well as at the side, and after having well oiled it, to pass it gently into the bladder for as short a distance as possible, and withdraw the catheter just as the bladder is on the point of being emptied, which saves the mucous membrane from flapping down on the end. Then with a syringe throw up through the catheter warm water slightly acidulated with either nitric, hydrochloric, or acetic acid. Vinegar does very well; if nitric or hydrochloric acid, about two drops of the strong acid to the ounce of warm water. As soon as the patient complains of desire to micturate, allow it to flow away again. This should be repeated till the bladder seems clear of the phosphates and mucus. About half a pint of acidulated water will generally suffice. Then inject also through the catheter about one grain of morphia dissolved in about an ounce of water; quickly withdraw the catheter from the urethra, and instruct the patient to retain it as long as possible. It is rare that the single application does not produce great relief. This treatment may be repeated twice daily if the case be very severe. When the urine has not been markedly alkaline, Dr. Hicks simply injects the solution of morphia, or first washes out the bladder with warm water or warm solution of permanganate of potash. After some days of this treatment he sometimes employs, instead of the permanganate of potash, a solution of chlorate of potassa, about three or four grains to the ounce, using plenty, drawing it off after a few minutes, according as it gives pain, and then injecting the morphia. Regarding the dose of morphia, he adds that if there be no blood in the urine, and the patient feels no constitutional effects from a grain, he increases it to two grains. If blood appears in the urine, it is a sign of some abrasion, in which case the morphia is more likely to be absorbed; yet he has never seen any unpleasant symptom from two grains. The more that is used without affecting the system much, the better, locally subduing the nerve-irritation, and the tenesmus of the bladder, and the crushing of the mucous membrane which the contraction produces. As the acute symptoms subside more astringent washes may be employed, such as two or three grains of tannin, or three or four drops of solution of perchloride of iron in the ounce of warm water, using the morphia solution immediately after. The choice should depend on the amount of pain caused, the object being not to produce more than necessary. If the urethra be very tender, a bougie or catheter covered with tannin, made very smooth, and dipped in gum-water, may be introduced. A probe, on which a film of nitrate of silver has been fused, may be tried, or the surface may be mopped out with a piece of cotton dipped in perchloride of iron. In chronic cases a solution of nitrate of silver containing from five to ten grains to the ounce may be injected, followed by the introduction of two grains of morphia in solution. In the acute stages the warm hip-bath and warm sponge to the genitals are not to be omitted, together with perfect rest in bed; the bowels must be kept gently relaxed, and the diet should be simple and light. (British Medical Journal, July 11, 1874.)

Diagnosis of Cardiac Murmurs.—Dr. Balfour, in the course of his clinical lectures on diseases of the heart, observes that having determined the position of maximum intensity of the murmur, and ascertained its rhythm, we are prepared to state the nature of the lesion upon which it depends. All that we require to do this, is simply to remember that in the normal condition the auriculo-ventricular valves on both sides are closed during the systole of the ventricles, the arterial valves on both sides being opened; while during their diastole the reverse takes place, the arterial valves are closed, and the auriculoventricular valves are opened. Thus, a murmur, whose position of maximum intensity is in the mitral area, depends upon some defect in the mitral valve; if it be synchronous with the systole of the ventricles, it depends upon some defect in its closure, and is therefore a murmur of regurgitation backwards into the auricle; but if it be synchronous with the diastole of the ventricles, it depends upon some obstruction to the flow of the blood through the open mitral valve, and is therefore a murmur of obstruction. The first of these murmurs runs off from the apex beat, and more or less completely replaces the normal first sound. The second murmur accompanies or follows the second sound, but in no respect interferes with its production. That murmur, or portion of a murmur—for the murmur may be continuous—which follows the second sound by an appreciable interval, and whose position of maximum intensity is not only placed in the mitral area, but which is but little audible out of that area, immediately precedes and runs up to the first sound —is therefore pre-systolic; but a glance at a diagram he gives shows that the systole of the ventricles is immediately preceded by the systole of the auricles, and that what we term presystolic is truly auriculo-systolic in its rhythm. This murmur is not only a murmur of obstruction, but a murmur of obstruction to direct cardiac action, and, like all such murmurs, is always It is the only cardiac murmur invariably associated with actual disease of the valves affected. (Ed. Med. Journal, vol. xix. No. 12.)

Therapeutical effects of Bromide of Potassium,.—Dr. A. M. Ragland first refers to cerebro-meningitis as one of the diseases in which he has found bromide of potassium of great value. He and Dr. Alleyne have treated no less than seventeen cases of different degrees of severity with only one fatal case. It is of great service in hyperæmia of the brain, consequent on excessive mental toil, especially when accompanied by insomnia. He records two cases of puerperal eclampsia where it proved of great and immediate service, and he particularly desires to call attention to its value in the convulsions which so frequently

complicate the diseases of children. In all cases of infantile convulsions resulting from nervous irritation, whether centric or excentric, he gives bromide of potassium with perfect confidence that it will control them, whilst at the same time he endeavours to remove the cause by appropriate means. The following is his usual formula:—

Potassii bromidi, scrupulum unam. Tincturæ gelsemini, drachmam unam. Tincturæ valeriani, drachmas duo. Syrupi simplicis, uncias duo.

To children under one year of age one teaspoonful is given every hour till relief is obtained, after which its use is continued less frequently. He has also found it useful in the cases of some young females of an excitable nervous temperament, in whom may occur a state of hyperemia of the ovaries and uterus, accompanied by hyperesthesia of these organs without the existence of actual lesion. It is best given a few days before each menstrual epoch, and some preparation of iron may be given in the interval. In severe cases both remedies may be combined with good effect, as follows:—

Potass. bromid. drachmas quinque. Ferri sulphatis, drachmas tres. Syrupi acidi citrici, Aquæ cinnamomi, ana uncias quatuor.

One teaspoonful thrice daily. He refrains from referring to the use of bromide in epilepsy, as its value is well known in that disease. (New Orleans Med. and Surg. Journ. May 1874.)

The treatment of Venereal Warts and Condylomata.—Mr. Berry observes that the obstinacy to treatment of warts or vegetations of venereal origin situate on or near to the organs of generation is sometimes very great, for in some cases they will, in spite of active treatment, reappear and spread again and again. The most persistent of this class of growths are those which are small, have a well-defined and broad base, and are covered with a thin cuticle, and thus resemble very closely enlarged papillæ met with in other parts of the body. These warts will sometimes resist the most active agents, such as strong nitric acid, and even removal with scissors will fail to eradicate them, as they reappear in greater numbers with surprising rapidity. In two cases under his care lately, the daily application of a strong solution of sulphate of copper, the application of fuming nitric acid every second day, and removal with the scissors failed to effect a cure. The saturated solution of sulphate of copper

appeared to stimulate them, and, as the nurse remarked, caused them to grow more rapidly. In these two cases, he observes, it was often remarkable to see the reappearance of these growths after the application of strong nitric acid, for no sooner was the yellowish slough removed than they appeared as large as ever; on one occasion the acid was applied after their removal with scissors. Almost despairing in being able to rid the patients of these pests, he resolved to try the acid nitrate of mercury (liquor acidus hydrargyri nitratis), though with little faith in its efficacy, after having failed with nitric acid. In both cases (females) the warts grew on the perinæum, around the arms, and on the skin and mucous membrane of the labia majora. He oiled the parts around and applied the acid nitrate of mercury freely, by means of a firm pledget of lint, intending to do so again daily if required. Next morning, however, to his surprise, the warts had become much shrunken and appeared to be covered with a yellowish white slough; the patients complained of feeling very sore, and had been pained since the application. Poultices of linseed meal were now applied, and when the parts were cleaned the warts had almost completely disappeared (a second application removing them). and the skin where they had been was quite healthy. some cases, where the warts are one large granulating mass, giving forth an offensive discharge, he considers that removal with the *\(\ellarga \)* required; but in those cases where they cover a large surface the application of the acid nitrate of mercury will be found to be the best remedy. What part the mercury plays in its caustic or escharotic properties he is unable to say, but certain it is that the remedy is superior to strong nitric acid. (Medical Press and Circular, June 10, 1874.)

Extracts from British and Foreign Journals.

Treatment of Hooping-cough.—Dr. Mascarel states that in his opinion hooping-cough depends on two elements—a nervous element and a catarrhal element. The nervous element resides in the inferior branches of the pneumogastric nerves. This is so true that there is a form of gastric hooping-cough in which every attack of coughing is accompanied by vomiting. The catarrhal element has its seat at the orifice of the glottis and of the larynx, as well as through the whole extent of the mucous membrane, both aërial and digestive, receiving filaments from the two pneumogastrics, as is rendered evident by the masses of mucus of various kinds coughed up by children during and at the termination of their crises. If we once admit these two principles—a nervous element and a catarrhal element—we must act therapeutically against both; and as the nervous state is antecedent to the catarrhal state, we ought to act specially against the neurotic. Every morning between six and eight a minute dose of tartarised antimony should be given in solution in water. In children over two years of age, the antimony may be replaced by ipecacuanha. Every evening at the last meal a small pill may be given containing one-eighth of a grain of extract of belladonna, which may be gradually increased till five or six of the pills are taken at once. Dr. Mascarel has tried this plan for from eighteen to twenty years, and has hardly ever known it to fail in relieving or completely curing the disease in three weeks. The use of the belladonna should be gradually discontinued. An essential condition of success is to have the extract of belladonna pure, and one test of its purity is the appearance of a peculiar exanthema over the face and body of the child, which may so alarm the parents that it is prudent to forewarn them of its occurrence. This only appears, however, once in seven or eight cases, and its slight gravity is shown by its spontaneous disappearance in the course of a few hours. A second evidence of the goodness of the preparation is the dryness of the throat, which many of the older children complain of. Dilatation of the pupils is rarely observed, unless

the remedy has been applied directly to the eyes. In cases where the cough is extremely violent and is accompanied by vomiting, when it may produce hernia and ecchymosis of the conjunctiva, the employment of emetics is contra-indicated, and instead of them small doses of syrup of morphia, with a little ether, may be given, the use of the belladonna being continued. After breakfast, a few teaspoonfuls of strong coffee may be given with advantage. Dr. Mascarel does not believe in the beneficial effects of change of air, as he has had cases under his care that have come from a distance, and in which nevertheless the disease pursued its course unaltered. (Bulletin Général de Thérapeutique, June 30, 1874.)

The use of Ouinine in Infantile Diseases, and especially in Hooping-cough.—Dr. Rapmund, in an essay on this subject, remarks that quinine and cold affusions are the remedies which possess the most certain and energetic antipyretic properties. Both are particularly useful in country practice, when the practitioner cannot have recourse to the agents of too complicated a character, partly on account of the difficulty of seeing his directions properly carried out, and partly on account of the stupidity of the patients. The chief objections to quinine are its cost and extreme bitterness. Its power over febrile affections is, however, very great. In 1872, Hagenbach, in the Annales de Thérapeutique Infantile, demonstrated that quinine acts not only in lowering the temperature and moderating the frequency of the pulse, but in shortening the period of convalescence. It is at once, he maintained, an antipyretic and a tonic. His observations were made on children arrived at the period of second dentition. Dr. Rapmund, on the other hand, chiefly observed its effects in much younger children, some being still at the breast. He administered quinine in four cases of scarlet fever, eleven cases of measles, two cases of smallpox, three cases of erysipelas, nine cases of lobular pneumonia, and three of follicular enteritis. Country practitioners know very well that parents do not send for medical advice in the ordinary exanthemata unless serious symptoms appear. such cases he speaks in terms of praise of the immediate administration of quinine. Previously to its being given, the child has often been in his practice excited, sleepless, delirious. and the cause of great alarm to the relatives. But as soon as a sufficient dose had been taken, the temperature and the frequency of the pulse fell, and the children enjoyed a calm and prolonged sleep. This hypnotic effect is of the greatest importance in children, enabling them to recover their powers during repose. Its value has been particularly insisted upon by Professor Jürgensen in respect to the treatment of croupal pner-

Quinine has also a marked influence in rendering the march of febrile diseases benign. Vogel, in the Dictionnaire des Maladies de l'Enfance, has recently declared that quinine is the only remedy that has succeeded in his hands in erratic erysipelas; and Dr. Rapmund has been equally successful. The dose was about two or three grains per diem. The strength of the patient must be kept up, especially when the erysipelas spreads. The affection in which quinine is serviceable par excellence is the lobular pneumonia of infants, and Dr. Rapmund prides himself on having obtained seven successes out of nine cases. In this disease death supervenes in consequence of cardiac insufficiency due to the violence of the fever, and it is obvious that quinine is exactly adapted to counteract this condition. When the extremities are pale and cold and cyanosis has set in, quinine is useless; but in a less advanced stage, when the febrile symptoms are acute and the temperature and pulse are much above the normal, quinine is formally indicated, and under its influence not only does the fever diminish, but the thoracic symptoms improve. The number of respirations, which often rise to eighty per minute, falls to thirty or less; the nostrils cease to dilate, the contractions of the diaphragm become less painful, and the child becomes calm. In cases of hooping-cough, quinine appears to diminish the violence of the attack, and better rest is obtained at night; and it appears to prevent complications, and to render the course of the disease much more uniform and benign. Children should be well supported either by means of milk or by beef-tea. In very feeble infants, small quantities of wine may be administered. regard to follicular enteritis, careful treatment with a wet-nurse is essential, and quinine is a valuable adjuvant. When from any cause quinine cannot be taken by the mouth, it may advantageously be administered in the form of a clystic. Dr. Rapmund prefers the hydrochlorate of quinine, and its intense bitterness may be to some extent concealed by the addition of a little glycerin to the mixture. The flavour is also masked by its being dissolved in coffee. (Deutsche Klinik, 1874, p. 167.)

The Tuning-fork as a means of Diagnosing perfection of the Membrana Tympani.—Dr. Thomas Rumbold states that he has recently suffered rupture of the tympanic membrane, by a severe explosion that occurred in making oxygen gas with the sulphuret of antimony, instead of peroxide of manganese, by mistake. By this accident he became acquainted with a phenomenon which is of great value in diagnosing rupture or perforation of the membrana tympani. In the examination of aural affections, whilst explaining how patients should observe the well-known variations of sound of

the tuning-fork, he had often applied this routine to himself. After recovery, except laceration of the membrane, he repeated this experiment upon himself, and was greatly surprised by finding that on closure of the auditory meatus by pressure on the tragus he could not detect the variation that he had frequently

heard previously to the injury.

Very naturally, on the same day Dr. Rumbold tried this method of examination on two patients then under treatment, and both of whom he knew by ocular inspection to have perforation of the drum-head, and found the same results. He then in like manner examined every other patient, and in no instance found that in the ear having a perforated membrane did the sound of the tuning-fork increase by closure of the auditory meatus. With each of eight membrane tympani that were operated upon for the insertion of the "Politzer eyelet" to increase the hearing, the sound of the fork was increased by stoppage of the auditory canal previous to the perforation, but not after it. In six of these cases, after they were closed by granulation, he found that pressure on the tragus again caused increase of sound of the tuning-fork. With each of three membranæ tympani having traumatic openings, closure of the meatus did not increase the sound of the tuning-fork, but after the perforation had healed, sound was increased by this procedure. In conclusion, he adds, should the Eustachian tube in any case of perforated membrana tympani be impermeable, this will be the only certain means of detecting this condition, especially if the opening be small and hidden. (St. Louis Medical and Surgical Journal, June 1874.)

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¹ Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Beillière, of King William Street, Charing Cross.

Department of Public Bealth.

REPORT OF THE MEDICAL OFFICER OF THE PRIVY COUNCIL AND LOCAL GOVERNMENT BOARD.

The reappearance of Mr. John Simon's reports, after two years' cessation, is an event the significance of which it is not altogether easy to estimate. On the first blush it might seem from the publication that Mr. Simon had at length been enabled to take the position in the administrative proceedings of the Local Government Board which was due to his official standing before his connection with that Board, but from which he had been debarred during the administration of Mr. Stansfeld, notwithstanding the stultification which this course involved both of the recommendations of the Royal Sanitary Commission and the provisions of the Public Health Act 1872. On closer consideration, however, it would rather appear that this report simply indicates that since the change of Ministry Mr. Simon has now the opportunity of stating the position which his department has held to the present time with respect to the central administration of the Public Health Act 1872, and of setting forth authoritatively his opinions of what the relations of his functions and the functions of his department to the sanitary work of the Board should be. We read this statement, first, as a dignified protest against the policy of Mr. Stansfeld in the inauguration of the Public Health Act 1872, and next, as a formal enumeration of the principles which, in the opinion of Mr. Simon, should govern the future sanitary administration of the Local Govern-

¹ Reports of the Medical Officer of the Privy Council and Local Government Board. New Series, No. 1.—Annual Report to the Local Government Board with regard to the year 1873, with Appendix. Blue Book, 1874.

ment Board, in respect to the prevention of disease. This statement fully absolves Mr. Simon and his department from any responsibility for the untoward consequences which have hitherto followed from Mr. Stansfeld's administration, and it equally absolves Mr. Simon and his coadjutors in the future should Mr. Stansfeld's policy of administration be persisted in by his successor.

The report contains thirty-one pages, of which eight only are occupied by Mr. Simon's report, and the remainder by the title-page and appendix. The latter contains summary accounts of the work of the Medical Department of the Board as to inquiries with regard to local administration of the Sanitary Laws and proceedings as to vaccination and cholera. The importance of the report itself is in the inverse proportion to its size; and the different paragraphs, where not occupied by mere matters of detail, are so pregnant with instruction that it is impossible to do justice to them without quoting the greater number. This, having regard to the grave issues to which they refer, we shall have no hesitation in doing.

Mr. Simon commences by stating that as the officer appointed to make report to the Local Government Board, for the annual information of Parliament, in relation to matters concerning the public health, and to the inquiries and other proceedings which the Board, under the Public Health Act 1858, may have directed in such matters, he submits that for the past two-and-a-half years, and particularly during the last year, "the circumstances of official and administrative transition, consequent on the Acts of Parliament of 1871 and 1872, have been such that no consistent scheme of report in general relation to the sanitary interests which are under the Board's superintendence has been possible to him; and the present, which regards the year 1873, must necessarily, even more than its predecessors, illustrate the difficulty of the unsettled circumstances."

Mr. Simon then proceeds:-

"Of the Board's business during the year 1873 in matters of concern to the public health, the largest and incomparably the most important part was that which related to the action of local sanitary authorities under the Act of 1872 in appointing their Officers of Health and Inspectors of Nuisances. This action, which the Legislature, at the instance of the Royal Sanitary Commission, had made obligatory on all the local authorities, and which included as its most

important feature that for the first time the medical profession throughout the country was to be brought into official use with a view to the better prevention of disease, was, at least in part, even in the terms of the statute, tentative; and evidently the discretion to be used by each authority in its compliance with the terms of the law would, for better or worse, be of great future consequence to the local working of the Sanitary Acts, and to eventual public estimation of the new machinery. The Board throughout the year 1873 was advising local authorities in detail on particular schemes of appointment and duty for the abovementioned sanitary offices; but this branch of business was exclusively in the hands of the non-medical officers of the Board, and I therefore do not here attempt to give any account of the proceedings or their results."

We have here the authoritative statement of a fact, which had been previously generally inferred from results, that in the administration of the Public Health Act 1872 in its medical relations, by the Local Government Board, under the presidency of Mr. Stansfeld, the Officer appointed by the Legislature to advise the Board on such administration was deliberately set aside, the non-medical poor-law inspectors being substituted as advisers for him. That is to say, the Board elected to ignore the vast and matured experience of the subject-matter it had to deal with, placed at its command, thus frustrating the manifest intentions of the Legislature. There would be something infinitely grotesque in this freak of administrative wisdom were it not for the serious consequences involved in it. Mr. Stansfeld, not content with the inherent difficulties of sanitary administration, must needs import into such administration the difficulties arising from the necessary want of experience, both technical and practical, of the gentlemen he entrusted with the initiation of the Public Health Act 1872; and now it has come to pass, as was to be anticipated, that the difficulties which have been created by the untutored action of these gentlemen have become among the most formidable with which the Legislature will have in future to contend. The complications they have introduced into the districts of medical officers of health is an illustration in point.

This much for the past. As to the future, we quote Mr. Simon's observations uncurtailed. They cannot be too widely known or too closely studied by medical men, not solely in regard

¹ In regard of rural sanitary districts the first appointments of Medical Officers of Health and Inspectors of Nuisances under the Act must be for a period not exceeding five years.

to their subject-matter, but also in regard to the relation of the medical profession to the Civil Service of the State:—

"The above account refers, as I have stated, to a period of official and administrative transition, during which it is impossible to represent the Local Government Board as directing inquiries under the Public Health Act 1858, in any definite relation to the new sanitary system of the country: but with the end of the year 1873, that period of transition may be deemed to have nearly accomplished itself; and I may hope that before the next season arrives for the submission of the Annual Report under the Act of 1858, it may have become possible to begin in a really useful sense such new succession of reports as the changed conditions of sanitary administration seem henceforth to require.

"If, in that hope, I may venture to indicate from beforehand the purposes which it seems to me the reports under the Act of 1858 must in future be expected distinctively to fulfil, I would say that, whatever else they may be expected to do, at least they must be expected to set forth the knowledge which the Board, through its department of sanitary inquiry, obtains with regard to the practical effect of the laws which are in force for the prevention of disease throughout England. It is the common conviction of persons who have most studied the subject, that the deaths which occur in this country (now about half a million a year) are by fully a third part more numerous than they would be if existing knowledge of the chief causes of disease were reasonably well applied throughout the country; and I need hardly add that, if thus some 125,000 cases of preventable suffering annually attain their final record in the death-register, that vast annual total has the terrible further meaning that each unit in it represents an indefinite (often very large) other number of cases, in which preventable disease, not ended in death, though often of far-reaching ill-effects on life, has also during the year been suffered. The Local Government Board, viewed as a Central Board of Health, and the more than fifteen hundred district authorities which, each with its appointed Medical Officer of Health, locally administer the health-laws, may be regarded as having had their respective functions assigned to them in special and systematic relation to that state of things; and it will be peculiarly with regard to that relation, namely, as rendering account of the central share of the responsibility, that the future annual reports of the holder of my office will, I apprehend, have their essential meaning.

44 In the sanitary administration of England, there are certain prescribed cases (chiefly in regard of local powers of rating, mortgaging, and by-law making) where the local action cannot be taken without previous express approval of the central authority; and no doubt the central authority, in its exercise of that responsibility, has often been able to influence very advantageously the course which local authorities have proposed to take. Also it possesses, in supposed reserve for great epidemic emergencies, a power to issue directions for certain purposes under the Diseases Prevention Act 1855. But with exception of such special cases, the function of the central authority in regard of local sanitary action is primarily one of mere observation and inquiry. Not itself authorised to interfere in such action except where the results are at fault, it watches and interrogates results; and it is distinctively in this relation to the sanitary interests of the country that the Local Government Board will be represented by its ordinary proceedings under the Public Health Act 1858. For the eventual test of local sanitary administration will be the success with which it prevents disease; and, in each case where the preventable disease is not prevented, the Local Government Board can, by skilled inspection under the Public Health Act 1858, satisfy itself as to the circumstances and causes of the failure: giving thereupon such skilled advice, or proceeding in certain extreme cases to issue (under § 49 of the Act of 1866 or under the Diseases Prevention Act) such orders and directions as the particular occasion may require.

"What standards of success in disease prevention ought to be taken as satisfactory by the local authorities which now have to act in that matter, and by the central authority which has to superintend their action, is a question on which I need not here submit more than very few general observations. Our large annual total of preventable deaths receives probably from most or all of the fifteen hundred sanitary districts of the country, contributions, larger or smaller, which in their respective degrees are evidences of sanitary unsuccess; and I would therefore point out, as of very important bearing on the whole tone of sanitary administration, that, in the death accounts which have henceforth to be critically examined by both Central and Local Authorities, figures which arithmetically make but little show may, for administrative purposes, have immense meaning. One or two deaths by enteric fever, noted in a Quarterly Return of the Registrar-General in regard of some village or small country town, may in hundreds of instances correspond to long-continued local conditions of scandalous filth and unwholesomeness: one or two deaths by scarlatina or small-pox, almost unnoted in regard of some considerable town, may represent the beginning of what, three months later, will be a terrible epidemic, agitating the community with distress and fear, and adding prodigiously to the whole year's death-rate of the place; and it is with reference to considerations like these, that records of even single deaths will now have to be medically read and interpreted. In regard of such epidemic visitations as are aptest in this country to excite local alarm, and to be felt as conclusive appeals for central interference, it may appear a mere truism to say that, in proportion as the disease is present, the time for preventing it is past: but for practical purposes it is indeed all-important to remember that sanitary administration has its hopes of success in preventing, not in arresting, great epidemics; and that if warnings are not taken from the smaller excesses of disease, catastrophes, not further warnings, may be next to come. It seems almost unnecessary to add that a method of procedure which waits for death as its ground of action may peculiarly dispense with cumulative proofs; and that, as no one preventable death can any longer be remedied in regard of him who has suffered it, so the record of it may the more emphatically claim to be read as a protest on behalf of others.

"The vigilance which the Local Government Board has to exercise in regard of the local prevention of disease in England will of course not universally need to express itself in the form of inspections. As regard the Board's giving of advice or assistance to local sanitary authorities and their officers, clearly this would be limited, first, by the fact that, unasked, it could not properly have place except where the local results showed need for it; and secondly, by the consideration that, in the large and permanent interests of sanitary government, a maximum of local self reliance and a minimum of central intervention are in themselves important aims. And even as regards mere inquiry into the facts of what is locally going on, correspondence (often bringing in the reports of local officers) will in some cases afford the Board all adequate information for its purpose.

"On the other hand, and provided due regard be had to the above considerations, the advantage which may be gained to the sanitary progress of the country by inspections conducted, at least for many years, on a sufficiently large

scale, under the Public Health Act 1858, can hardly, I think, be over-estimated. It has, I believe, been the experience of the Local Government Board in those branches of its administration which do not concern the public health (as particularly in its poor-law and common municipal business) that the personal agency of Inspectors of the Board, as distinguished from mere inquiry and advice by letter, is, in a very large proportion of cases, essential to the success of the work: first, in order that the Board may competently understand the local conditions or proceedings which it desires to judge; and secondly, in order that, in a degree and with an effect which no letter-writing can attain, it may make to the local authorities with which it has concern precisely such representations, and may give them precisely such advice, as the particular local circumstances require. The Board would probably not expect experience of a different kind in its future, essentially medical, province of sanitary superintendence; and indeed, as regards this province, my own experience enables me to say with certainty that it is peculiarly one in which clerical, as compared with inspectorial agency, would show itself inadequate to the purpose. skilled inspections under the Public Health Act 1858, on such a scale as practically to represent a central audit of local death-accounts, and an exertion of central influence or authority in favour of more active or better-directed local efforts in places where human life had not been sufficiently cared for, the Local Government Board would be in reality, though only in the limited sense which the law prescribes, a Board of Sanitary Superintendence for England.

"Briefly, then, as regards the annual reports to be hereafter made under the Public Health Act 1858, the state of the case, as I apprehend it, will be thi. The Local Government Board will from time to time determine what degree or central vigilance as to the local prevention of disease shall be represented by its proceedings under the Act, and will regulate in accordance with such standard of work the staff by which the work has to be executed. It will be for the holder of my office annually to lay before the Board a report of the proceedings so taken: substantially a report on the new sanitary administration of the country, as examined by the Board from the standpoint of results; and which, so far as means for it exist, would aim at exhibiting, for the information of Parliame what year by year are the chief existing excesses of disease in the several sanita divisions of England, and what the relation of such excesses to insufficiencies of law or administration. Incidentally to the above, which I have regarded as the essential business of future annual reports under the Act, it would probably be of advantage to the public service that the reporter should use the same annual opportunity for submitting to the Board, with a view to publication, such new knowledge as the Medical Department might during the past year have acqui with reference to the prevention of disease, and such new memoranda of advice on sanitary subjects as the growing experience of the department might be held to justify.

"From among the many points of local relation which the Board's sanitary superintendence must include, there is one which in conclusion I will specially mention: not indeed without confessing that, in love and honour for my own profession, I regard it with warm personal interest; but believing that I may, nevertheless, without partiality describe it as of fundamental interest to the working of the scheme of recent legislation. While watching, from the point of view of results, the action taken by local authorities throughout England for the · better prevention of disease, the Board will be superintending the exact province of work for which the respective local authorities under the Act of 1872 are required to appoint their Medical Officers of Health; and the inspections

under the Public Health Act 1858 will therefore, so far as they extend, give the Board knowledge of the working of that new institution in the various forms in which it is being tried throughout the country, and in which, in regard of about half the number of cases, the trial is with the Board's part-payment and particular responsibility. Such inspections, too, as bringing the Board's Medical Department into direct relation with the local officers of health, and giving the department opportunity to contribute any assistance in its power to the success of the local institution, will, where they extend, represent an object which the Royal Sanitary Commission, in making the recommendations on which the Public Health Acts of 1871 and 1872 were founded, put forward as an element of their scheme. As regards that intention of the Royal Sanitary Commission, I need hardly say that, to any holder of my office, it must always be among the highest of ambitions to be able to see the experience of this department really conducive to the information and influence of younger fellow-labourers in other parts of the same great field of public service; and it would be affectation in me to deny that, during many early years of the new organisation, relations in that sense between the central and local services may often be of important, and sometimes of indispensable, use to the latter. I would, however, also express my confident expectation that, though from the nature of the case the relation in these carlier years must chiefly consist in assistance which the central office can so render. succeeding years will more and more bring the central office under obligation to local contributors of knowledge, and to local illustrations of progress. And year by year it will surely grow to be among the most useful, as it must also be among the happiest, duties of the annual reporter under the Public Health Act 1858, to represent, for the information of all the officers of health of the kingdom, such additional fruits of scientific observation, and such new evidences of practical success, as will have come to the Board's knowledge from among their number."

There is but one comment we shall make on the foregoing observations. Mr. Simon speaks of bringing the Board's Medical Department into *direct* relation with the local Officers of Health. Until such direct relation is brought about, the Board's relations with these officers will be a series of blunders not less detrimental to efficient local sanitary administration than the blunders already committed.

THE OXFORDSHIRE COMBINATION OF SANITARY AUTHORITIES.

THE publication of Dr. Child's Report by a London house, and the reservation of all rights of publication, as stated on the titlepage, give to the Report a special importance. They indicate that the author has prepared the Report with other objects than those which attach to its local interest, and that he claims for it a wider consideration than a local publication might secure for Dr. Child has done well to give this special prominence to his Report, for among the different reports of Medical Officers of Health for combined districts which have hitherto appeared, none claims a more attentive consideration from all who are concerned or who take an interest in local sanitary administra-The Report demands attention, first, from its containing a vigorous defence of Mr. Stansfeld's administration of the Public Health Act 1872, so far at least as the formation of combined districts for Medical Officers is concerned; and next, as expressing views on rural sanitary hygiene differing in several important respects from those commonly accepted.

Dr. Child (to reverse the order of his Report, for reasons which will be apparent presently) takes exception to certain strictures on the working of the Sanitary Act 1872, which appeared in the Times of April 3 and Pall Mall Gazette of April 6; strictures which we confess very closely agreed with opinions previously expressed in this journal. Hence our interest in Dr. Child's rejoinder. The principal charges made, writes Dr. Child, "may be resolved into the two propositions: (1) that the Act has been a total failure in practice; and (2) that its failure has been due rather to faults of administration than defects in the Act itself." The first of these charges Dr. Child, while admitting that neither sanitary administration nor sanitary work is such as he would desire it, characterises as "a gross exaggeration," and

¹ Report upon the Sanitary Condition of the Districts of the Combined Sanitary Authorities of Oxfordshire. From Lady-day 1873 to Lady-day 1874. By Gilbert W. Child, Officer of Health to the above Authorities. Longmans and Co., 1874. 8vo. pp. 63.

says, "in answer to it, that in his own district a great amount of improvement has been effected in the last twelve months, and a still greater amount of knowledge has been gained, both of which results are due to the Act of 1872, and would not have been attained without it." But what has this to do with the organisations it was the special purpose of the Public Health Act 1872 to bring about, and by the success or not of their arrangement, for the particular purposes they were designed to meet, the administration of the Act must be judged? Can Dr. Child point to a single instance of a Medical Officer of Health's district formed under the advice of the Local Government Board in which the formation was governed by the duties to be porformed by the officer? Can he say of any of the combined or of the single districts so formed that, except by accident, it admits of a reasonable exercise of the duties of the Medical Officer of Health as set forth in the regulations of the Local Government Board? If the anomalous secondary sanitary and unworkable districts which the Local Government Board has scattered over the kingdom, varying in size from a petty parish to a county, are to be regarded as proofs of the success of the Public Health Act 1872, we have nothing more to say on the subject. That the officers appointed under the Act have done some work in the removal of nuisances, and have acquired some knowledge of their districts, are facts commendable as far as they go, but, as Dr. Child himself remarks, "the results obtained are not commensurate with the magnitude of the machinery which has been brought into operation in order to obtain them." He adds: "This is due to the novelty of the whole process employed, and to the tentative character of the legislation upon which it is based." We shall see the value of this plea of exoneration in our comments on Dr. Child's observations on the second adverse proposition he deals with, namely, that the failure of the Act of 1872 has been due rather to faults of administration than to defects in the Act itself. charge Dr. Child gives an explicit denial. He says: "I can say, without the smallest hesitation, that it is not only not true, but is the direct reverse of truth." Now, it is from the light which Dr. Child's Report throws upon this question that his Report derives much of its interest. He follows up

his contradiction of the charge by the following remarkable sentences:—

"It is by defect of the Act that sanitary law is left to be gathered by the clerks to the several authorities out of some forty different Acts of Parliament. It is by defect of the Act. again, that the authorities are left with insufficient powers to enable them to deal efficiently with epidemic disease, unwholesome water, and a hundred other matters which go to make up adequate provision for public hygiene; and, finally, it is by virtue of the Act that each local authority is possessed of that liberty of choice in regard to appointment of officers and modes of administration which the writer in the Pall Mall Gazette looks upon as having in a degree defeated the objects which the Act itself was designed to effect. It is idle to scold the Local Government Board for permitting the exercise of a liberty of choice which was given by the law, and which it possessed no power to restrain. No amount of administrative skill would suffice to work satisfactorily so imperfect an instrument as the Sanitary Law at present existing " (p. 61.)

In other words, according to Dr. Child, the Local Government Board is justified in administrating badly a certain Act entrusted to it, because it does not contain something not intended by the Legislature that it should contain. Let us see how this is borne out by the arrangements of Dr. Child's district as told us by himself.

This district consists of seven large rural unions, having an aggregate population of 105,945, and six small urban districts with a population of 18,905, making a total of 124,850, occupying an area of 700 square miles. During the first year of Dr. Child's office he "was not supplied either with the district registrar's returns, nor with the sickness returns of the district medical officers, nor was there any arrangement made by the various sanitary authorities of the district by which information should be conveyed to him of the occurrence of epidemic disease." That is to say, that in forming the district the arrangements requisite for carrying out the essential duties of the office, by no means novel in character, were not made by the Local Government Board, although fully within its competence; and that the Board is entirely responsible for having nullified

largely Dr. Child's appointment for the first year is shown by his further statement, that "great efforts have lately been made by the Local Government Board to supply these deficiencies. and they are being in most cases very readily and earnestly seconded by the various local authorities." As to workableness of district, Dr. Child says: "My own district, being of the dimensions given above, is practically quite unmanageable, not because it is too large or too populous, but simply because it is inaccessible. The Henley Union, in particular, contains places some thirty-five miles from Oxford, not to be approached within a dozen miles or so by railway, and then only by branch lines, involving a waste of time, labour, and money which is quite disproportionate to the requirements of the case, and quite needless if only the districts were arranged with any regard to practical purposes" (p. 51). As might be anticipated from this unmanageable district, we look through Dr. Child's Report in vain for those close relations with his different local authorities and with the inspectors of nuisances which have hitherto been regarded as essential to the efficient carrying out of a medical officer of health's duties, and which are necessary to the thorough execution of those duties as defined by the regulations of the Local Government Board. But for the arrangement and formation of this district, unmanageable. according to Dr. Child, not by reason of its size or of its population, but of its arrangement, the Local Government Board is wholly responsible. Dr. Child sees in this bad arrangement, not a failure of judgment on the part of the Board, but a defect arising from the insufficiency of the law, enabling the Board to compel sanitary authorities to submit to proper arrangements. But this plea in no wise mitigates the charge against the Board, for the Board has to administer and advise upon the law as it is, not as it might be. Again, the want of provision for the proper co-ordination of the different parts of his district is dwelt upon by Dr. Child (p. 59), and he fails to observe the serious responsibility resting upon the Local Government Board for having advised combined districts without having first secured (a matter quite within its competence) such necessary co-ordination.

Dr. Child's Report is the most instructive, because uninten-

tional, illustration we have yet had of the faulty administration of the Public Health Act 1872, by the Local Government Board, under Mr. Stansfeld's presidency. The greatest condemnation of that administration yet uttered is the plea of extenuation, advanced by Dr. Child, that arrangements such as those which characterise Dr. Child's district are defective by reason of defective law, not of defective judgment. For if the plea were sound, which it is not, it would simply mean that the Board had advised beyond its competence, and that it had blundered equally in the subject-matter and in the law.

The portions of Dr. Child's Report which deal with the hygiene of rural districts raises numerous questions of interest. We pass over his descriptive accounts of the sanitary condition of the several parts of his district, and cull here and there some of the opinions best calculated to provoke thought. And first he expresses a decided opinion on the advantages of surface drains in certain circumstances. purely sanitary point of view," he writes, "I believe them to be infinitely better than either the cesspool or the sewer system, as they are at present used" (p. 5). Again, on the important question of filth-removal, he observes: "I have felt it to be impossible to recommend any of the authorities in my district to undertake any systematic cleansing of their towns or villages, for the highest professional authorities are so much in doubt on the subject as to be unable to indicate any one system as the best, or even as generally successful or satisfactory; and until some such indication can be given, it seems idle to recommend any place to incur a heavy expenditure without any adequate assurance of permanent advantage." We confess that this takes us by surprise, for is a Sanitary Authority justified in not undertaking (p. 7) "systematic cleansing," until some one system can be indicated as best? We believe not, and that the authority is bound to take the best measures within its power, and without undue delay, of abating the nuisances which systematic cleansing is designed to remove. Does any reasonable ground exist for the belief that one system will be eventually discovered applicable to all places and conditions irrespectively?

Dr. Child has no faith in dry systems of refuse-disposal, except in isolated houses. His experience leads him to the con-

clusion that "they can never be satisfactory in towns, or even in any village where houses are collected together sufficiently to form a street." Dr. Child's objection appears to rest upon the fact mainly that these systems do not meet the difficulty of the liquid refuse, and he holds it of comparatively small importance whether the absolute excreta are kept out or allowed to mingle with this refuse.

The system which appears to Dr. Child "best suited for all villages and towns in which there are no regular waterworks is one which up to the present time has found no favour in England. It is the system of water-tight cesspools, carefully ventilated, and emptied by means of atmospheric pressure, as is at present in use in the city of Milan" (p. 8). This suggestion is noteworthy because, first, it runs counter to the principle now so largely being adopted and put in practice by Sanitary Authorities, of very frequent systematic removal of excremental matters, and the application of liquid refuse immediately to land; next, from the implication that watertight cesspools not productive of nuisance can be secured for ordinary use at a cost not prohibitory; and that the pneumatic mechanism required for emptying these cesspools and the subsequent disposal of the cesspool matter will be less, or at least not more, troublesome than existing seemingly simple We do not gather that Dr. Child writes from a recent experience of this system in work at Milan; but we trust that he will publish a detailed account of the system, with particulars as to probable cost and mode of working.

In his remarks upon water-supply and houses unfit for habitation, Dr. Child appears to entertain little hope of permanent good being effected in rural districts until the Legislature very considerably extends the powers of Sanitary Authorities to provide the former and replace the latter. He would, moreover, considerably extend the powers of Sanitary Authorities with respect to infectious diseases. He remarks (p. 55) that "until the conditions of life amongst the poorer classes are greatly altered, it is to a system of quarantining within cottages, rather than to one of removal of sick into hospitals, that we must look to provide a really efficient check to the spread of epidemic disease. The method," he adds, "possesses the advantages of

being cheap, practicable, and efficient, whereas the other, so far as I can see of it, has none of the three." Dr. Child would remove the healthy members of the household in which the infection exists to a house of refuge (so to speak). He observes: "In order to carry out the quarantine system efficiently, it is necessary to pay the wages of the sound members while the illness lasts, and to confine them either to the house in which illness is or to the one to which they have been removed, as above suggested" (p. 5). It would have been instructive to see these suggestions treated with greater detail in respect to the three questions of cheapness, practicability, and efficiency.

Among the incidental matters of interest in the Report is the following, relating to the distance to which fluid matters may travel in a porous soil. It follows upon an example of typhoid fever caused almost certainly by excremental pollution of a wel in the village from which the illustration comes. Five wells in the village were discovered to be fouled by petroleum. These wells were on the slope of a hill, the lower three being dipping wells, the two upper each being 20 feet deep. The position of the wells to each other was such that they formed an irregular curve, and, beginning at the lower well, they were in succession separated from each other by the following distances: 99 ft.. 90 ft., 198 ft., 100 ft. Eighty feet beyond the upper well several barrels of petroleum had been buried four feet in the earth, and the greater part of the contents of one of them had escaped. The petroleum found its way into all the wells, rendering them useless for the time being.

Another suggestive instance noted in the Report relates to the probable introduction of the infection of typhoid fever into Ascot-under-Wychwood by foul clothes from America. The case is stated by Dr. Child as follows:—

"A man named Eli Pratley, who had previously emigrated to America, having there lost his wife, returned with his three children, all in very wretched condition, and took up his abode in his mother's house at Ascot on November 20, bringing with him several boxes containing clothes and bedding, many of them old and filthy. The remaining inhabitant of the house, viz. his brother, was attacked with typhoid fever on November 29, and his mother (who died of it) on the following day. Eli Pratley,

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on being questioned, at once said that his wife had died of The only other case in the neighbourhood typhoid fever. occurred on December 5, in the person of Pratley's married sister, who had been up to the house and taken away some of the dirty things to wash. It was suggested that the brother had taken the fever at another place (Foden's Hill), where he had been to work after Pratley's return; but further inquiry quite negatived that idea; for it appeared that he did not go to Foden's Hill until the 24th, and that though there had been fever in the house in July last, yet the house had changed tenants in the interval, and there had been no recurrence of fever amongst the new inhabitants. Moreover, in this case the mother must be supposed to have caught the fever from the son, and she was, as we have seen, attacked the very next day. There can, I think, be no reasonable doubt that the source of infection in this case was in the clothes and bedding brought by Pratley from America" (p. 35).

We commend Dr. Child's Report to the attention of our readers.

THE INTERNATIONAL SANITARY CONFERENCE.

THE International Sanitary Conference which has been called together at Vienna for the purpose of considering the question of quarantine in relation to cholera, bids fair to exercise a very influential effect upon professional and public feeling on this subject. The Conference numbers among its members many of the most distinguished European authorities upon cholera, and it has displayed an aptitude for business as pleasing as unexpected. The Conference held its first meeting on the 1st July, when its proceedings were opened by H. E. Count Andrassy, the Minister of Foreign Affairs, who was accompanied by Baron de Hofman, Baron de Orezy, and Chevalier de Schwegel. this meeting delegates from the following States were present: Germany, Dr. Pettenkofer and Dr. A. Hirsch; Austro-Hungary, H.E. Baron Maximilian de Gagern (delegate of the Ministry of Foreign Affairs), Chevalier Auguste d'Alber-Glanstätten, Dr. Francois Ulrich, M. Charles Haardt de Hartenthurn, Dr. A.

Drasche, Dr. Charles Sigmund, Dr. Leopold Grosz, M. Hector Catinelli, Dr. Joseph Schlosser, and Dr. Nicolas Severinski; Belgium, Dr. Henrard; Denmark, Dr. Schleisner; France, Dr. Fauvel and M. Ring (First Secretary of Embassy); Great Britain, Dr. Dickson (Physician of Embassy, Constantinople), and Dr. E. C. Seaton; Greece, Dr. Orphanides; Italy, Dr. Semmola; Luxembourg, Dr. Schmidt; Norway, Dr. Kierulf; Netherlands, M. Reeder and Dr. N. van Capelle; Persia, Dr. Polak; Portugal, Dr. de Sousa Martins; Roumania, Dr. Marcovitz; Russia, Dr. Lenz and Dr. Kastorsky; Servia, Dr. Milossavlevitch; Sweden, Dr. Berlin; Switzerland, Dr. Charles Zehnder and Dr. Adolphe Ziegler.

After a brief address from Count Andrassy, responded to, for the Conference, by Dr. Lenz, Baron Gagern was elected President of the Conference, and he introduced as secretaries Dr. Adolphe Plason and Chevalier de Malfatti. At a subsequent period of the meeting, Drs. Pettenkofer, Lenz, and Fauvel were elected Vice-Presidents, and Dr. Sigmund delivered an address. In this address Dr. Sigmund observed that the object of the Conference was to deliberate upon the introduction of uniform measures of quarantine against cholera, and the formation of an international commission on the subject of epidemics.

A programme had been prepared for the guidance of the Conference in its discussions, and the Conference in subsequent meetings proceeded to discuss seriatim the different questions set forth in it. These are divided into three sections, the first preliminary, relating to the endemicity and mode of transmission of cholera; the second relating to measures of quarantine in time of cholera; the third to the institution of an International Epidemiological Commission.

The order of proceeding on the subjects contained in the first section of the programme, and which in fact included the conclusions of the International Sanitary Conference of 1866 on the same subjects, was by submitting the different propositions to the votes of the Conference. If the Conference voted unanimously in assent of a proposition, no discussion upon it took place; if not, the minority had the right of making such observations as they thought fit. By this arrangement a vast amount of needless talking was at once got rid of, and the whole work of the Conference simplified. In

this way the Conference unanimously affirmed that Asiatic cholera existed in an endemic state in India only; that the disease is transmissible by man; that it may be propagated by articles brought from an infected place, which have been used by persons sick of cholera; and that it can be propagated by drinks, particularly by water. A minority were, moreover, in favour of affirming the propagation of cholera by certain comestibles, by living animals, and by articles of merchandise.

The question of the transmission of cholera through the agency of water was not raised at the Constantinople Conference. The unanimous affirmation of this proposition by the present Conference, without discussion, is a proof of the inaccuracy of the opinion entertained by certain English and Indian epidemiologists that this so-called water theory is almost wholly confined to England.

The questions contained in the second section of the programme have been remitted, in the first instance, to committees. The committee charged with the question of maritime quarantine has already reported, and the result of the discussion of its report by the full Conference will be looked for with no little interest. The committee, which consisted of Drs. Hirsch, d'Alber-Glanstätten, Seaton, Semmola, and Van Capelle, has come unanimously to the following conclusions:—

Maritime quarantine offers no real protection against cholers, except in those ports which are to be regarded as the principal points of irruption of cholera in its seaward march towards Europe.

Quarantine in these ports should be instituted and organised very completely according to the most rigorous principles of hygiene, and it should be an international institution.

Quarantine in the ports of continental Europe is useless against cholera which has broken through the ports referred to as the points of irruption, seeing that the communications by land destroy its value.

In such conditions it is best to establish in European ports, in place of quarantine, a vigorous hygienic revision of every ship arriving from an infected port.

Should these propositions be accepted by the Conference, we may quickly hope to see some abatement of the perversities of quarantine.

THE PRACTITIONER.

SEPTEMBER, 1874.

Original Communications.

TWO CASES OF TYPHOID FEVER LATELY IN UNIVERSITY COLLEGE HOSPITAL.

Case I.—Edward Emery, aged 45, railway porter, admitted April 20, 1874.

History.—Patient is a strong-looking and well-built man, who has always been sober and steady in his habits. Has always had plenty to eat. Previous health good. No history of syphilis.

First taken ill on 6th April, when he was attacked, according to his own account, with erysipelas in the right leg. This lasted for about ten days, and after it had subsided he suffered from intense frontal headache, pain in the back, anorexia, thirst, &c. There were at this time several cases of typhoid fever in the same and in the adjoining houses.

On admission, patient was found to be suffering from a well-marked, though mild attack of typhoid fever, which appeared to have reached about the twentieth day. It was difficult to ascertain the date of commencement with any accuracy on account of the pre-existing illness. The fever ran its course without anything worthy of note occurring. The temperature was at no time higher than 102°2, and on the 2nd of May the morning temperature was normal. On the 4th of May the evening NO. LXXV.

temperature was likewise normal; and with one slight exception, on the evening of the 5th, there was no further rise until the evening of the 10th, when there was a slight elevation, viz., to 99°. On that evening, when seen, he appeared to be progressing favourably. He had been allowed solid food for the first time on that day.

On the morning of the 11th the following note was made:—In the course of last night patient woke up and found himself lying on his left side, a position unusual for him. On turning over he felt a sharp pain in the left hip, "as though he had ricked the joint;" he at the same time noticed that the groin was very tender, and in the course of a short time the pain extended down to the knee.

There was no numbness of the limb, but the foot felt distinctly colder than that of the opposite side. When first seen this morning the pain had extended into the calf, and there was acute tenderness of the part. The most tender spot seemed to be at about the centre of the calf, four or five inches below the knee.

There is also slight hardness and swelling of the femoral vein to be felt in Scarpa's triangle, and the femoral glands can be felt to be slightly harder than normal. There is very considerable tenderness in the groin and along the course of the femoral vein, but this is not so marked as in the calf.

There was at first slight mottling of the skin of the thigh and leg, but this passed off after the application of hot fomentations. There is still slight general duskiness of the leg as compared with the opposite one. The foot was perceptibly colder than its fellow. There is slight cedema of the ankle and lower part of the leg, but no perceptible cedema of the thigh. Both tibial arteries can be felt to pulsate at the ankle, and there is no redness along the course of any particular vein.

The attack has decidedly affected the general health of the patient. He looks worn and anxious. Appetite fairly good. Bowels not opened. Tongue somewhat furred. Great thirst. 10.30 A.M.: T. 98°6; P. 72; R. 18.

Ordered.—Hot fomentations to leg. Hot bottle to foot.

On examining his urine, the test with Fehling's solution gives unmistakable evidence of the presence of sugar. This was the same with two different specimens of Fehling, one of which was newly made for the purpose.

N.B. His urine had been repeatedly tested for sugar before the attack, without any results.

On applying the quantitative tests for sugar there was found to be too little present to be capable of accurate determination. In the evening at 10 P.M.: T. 100°8.

May 12.—Patient remains much the same. Duskiness of surface and cedema of ankles slightly marked. Tenderness of calf and groin still very great. The pain is a little relieved. 10 P.M.: T. 100°2. Sugar in urine much as before.

May 13.—Patient has passed a restless night. The pain has been very considerable, greater sometimes than at others. He has had attacks of shivering lasting for a few minutes, sometimes followed by profuse perspirations. These have come on at intervals of a few hours, more especially after the leg has been moved. Temperature is not raised during or after the shiverings. The leg retains its slightly dusky hue, but there is no increase of cedema. There is now a decided feeling of increased resistance in the calf, which remains exceedingly tender to the touch. There is the same condition of slight cordiness in the femoral vein. No further enlargement of glands of groin. There is now a subjective sense of cold in the left foot, accompanied by numbness. The foot is in reality as warm as the opposite one.—10 A.M.: T. 99°6; P. 88. 10 P.M.: T. 99°.4.

May 14.—Patient passed a quiet night, and there is much less pain in the leg, which has nearly lost its subjective sensation of cold and numbness. He is able to move it a little more easily. There has been no return of shivering. Condition of leg otherwise as before. Urine to-day contains scarcely a trace of sugar.—11 A.M.: T. 100°.4; P. 88.—10 P.M.: T. 101°.

Ordered.—B. Arg. nit. gr. v; sp. ether. nit. m xxx. Ft. lotio. To be painted along course of femoral vein in Scarpa's triangle.

May 18.—Since last report patient has been progressing favourably. He has now hardly any pain or tenderness in the calf or groin. There has, however, been more codema of the

foot during the last three days, and this persists to-day. The foot is not, however, blue, nor numb, and there is more movement in it to-day than there has been at any time since the condition came on. General health better. No fever. No sugar now in urine.

May 20.—Swelling and tenderness in calf almost entirely gone. Œdema of foot and ankle less. A little tenderness over the saphenous opening. Movements normal.

From this time the patient's condition continued to improve steadily. There has, however, always remained a feeling of slight branniness in the calf, and there has been at all times slight ædema about the ankle. This is increased by walking about. The movements are almost unaffected. He left the hospital on June 18.

Case II.—Annie Dalles, aged 24, housewife, admitted May 7. Patient is a slight-built and delicate looking woman. Married sixteen months. No children. Believes she has had one miscarriage. Regular in habits. Has plenty of good food. Had rheumatic fever when twelve years old. Scarlet fever, &c., when young. No history of tubercle in family.

She was first taken ill at the beginning of April, with suppression of the menses (for the previous four months she had suffered from menorrhagia). She had rigors and fever, with constipation, for three or four days. This was followed apparently in the second week in April by diarrhæa, with increased fever accompanied by delirium. The diarrhæa lasted about a week, and there was then alternately constipation and diarrhæa up to the time of her admission. Until the day of her admission the patient did not complain of pain or tenderness of the abdomen. Slight cough during the last two days.

On admission patient was thin and very anæmic. No sickness. Bowels have not been open for a week.

There is slight fulness of abdomen with very considerable tenderness, most marked in the epigastrium and least so in the hypogastrium and iliac fossæ. This tenderness is felt on very slight pressure. No pain unless pressure be exercised. Solid food causes pain a few minutes after it has been swallowed. No spots. Chest healthy.—1.45 p.m.: T. 101°; P. 112.—10 a.m.: T. 102.

It was diagnosed that the patient must have had an attack of typhoid fever, which was now in quite a late stage. She was allowed no solid food, and her bowels were opened by a simple enema.

Patient considerably improved after her admission. Her temperature became normal on the morning of the 11th, but there was slight elevation on the evenings of the 13th and 14th to 99°:2.

She from time to time suffered from difficulty in passing her water, and this was then drawn with a catheter. The tenderness of the abdomen almost entirely disappeared within a few days after her admission. She was first allowed a little finely minced meat on the 13th May, and she had also a little bread and butter.

May 17.—Patient was given a little minced meat for dinner at 12.30 P.M. At 1.30 she was seized with shivering, which lasted, on and off, for the whole afternoon. She was seized at the same time with localised pain in the epigastrium. She felt unwell, but not sufficiently so to call much attention to it, nor was the pain sufficiently severe to oblige her to ask for relief.

She was first examined at 9 P.M., when the physician's assistant was making his rounds. She was then feeling sick, but did not actually vomit. There was localised pain in the epigastrium, and tenderness on pressure over the whole abdomen, the tenderness being most marked in the epigastrium and left hypochondriac regions. The tenderness is, however, not extreme, and moderately firm pressure can be borne. She has occasional shooting pains in abdomen. Pain relieved by drawing her legs up, and she accordingly lies in that position. Slight swelling Skin hot and of abdomen, which is uniformly tympanitic. moist. Pulse small, but not wiry—132 per minute. T. 103°-6. Resp. rapid and shallow-40 per minute. Slight cough. There is a certain amount of anxiety and restlessness, but at the same time she is troubled with drowsiness, a condition unusual with Tongue moist, furred, rather relaxed. She still shivers from time to time. No albumen in urine.

Ordered.—R. Pulv. opii. gr. j. Ft. pil. 4tis hours. Brandy 3ij every hour. Strong beef-tea and milk ad lib. Poultices to abdomen.

May 18.—Patient passed a quiet night, sleeping on and off. She has had a constant feeling of nausea, and once she has been sick, the vomited matter simply consisting of beef-tea and milk which she had taken.—3 A.M.: T. 104°·2.—7 A.M.: T. 104°·2. This morning patient is looking very ill; expression anxious. She is drowsy from the effects of the opium. Skin hot and moist. Tongue thickly furred, with a tendency to dryness down the middle. She is still feeling sick. The tenderness is very general and very considerable over the whole abdomen. is no one spot which seems markedly more tender than any other, though the region to the right of the umbilicus is slightly more so than elsewhere. Very little shooting pain this morning, but she had during the night pains shooting into the groin. Slight fulness of abdomen. Can put her knees down without pain. Bowels confined. She is chilly without having any marked rigor, and has a feeling of cold water running down her back. Intense frontal headache.—10 A.M.: T. 104°·1; P. 124; R. 40.—1.30 p.m.: T. 104°·8.—6 p.m.: T. 104°; P. 128.—10 p.m.: T. 103°6; P. 120; R. 30.

May 19.—Patient passed a quiet night. She has been very sick during the last few hours, the vomited matter consisting of what she has taken. She says that the abdominal pain is more severe to-day, and the tenderness is certainly greater. The pains are of a sharp, shooting character, and she says that there is a feeling of constriction of the abdomen. The abdomen is not more swollen than yesterday. Tongue moist, large, and very thickly furred. Bowels not opened. Pulse 104, moderately full and soft; R. 36.—2 a.m.: T. 102°·2.—10.30 a.m.: T. 102°·5. 4 p.m.: T. 102°·2.—10 p.m.: T. 102°. She expectorates a little frothy mucus containing blood. Lungs not examined, as it seemed to distress her.

May 20.—Patient decidedly better. Pain not so severe or constant. Tenderness still very great. Vomiting has ceased. Abdomen greatly distended and tympanitic. Bowels confined. 6 A.M.: T. 100°·4.—10 A.M.: T. 99°·6; P. 120; R. 36.—10 P.M.: T. 99°·2.

May 21.—Passed a stool this morning, dark brown in colour and of fair consistence. Complained of great pain in passing it. No vomiting. Pain and tenderness less. Does not draw

up her knees. She has commenced to-day to menstruate; discharge very scanty. Has been all day very hysterical. 7 A.M.: T. 99°.—10 P.M.: T. 99°; P. 84.

May 23.—Patient very much better. Scarcely any pain, and much less tenderness. Much less distension of abdomen. No vomiting. She is cheerful, and sleeps well. Temperature normal. Pulse full and soft.

May 25.—Patient continued to improve until this morning, when she was again attacked with violent pain in the epigastrium, extending round to both sides. The pain is of a burning character, and quite different to what she had before. Abdomen not swollen or tender. No pain elsewhere than in epigastrium. Poultices sprinkled with laudanum applied, and the opium pill again ordered every four hours. Temperature normal. Pulse 108, small and soft.

May 26.—Patient much better: the pain has disappeared from epigastrium without the occurrence of further symptoms.

The patient continued to go on favourably until May 31, when, after several attempts to open her bowels (which had then been confined for about a week) by enemata, half an ounce of castor oil was administered by the mouth. Two stools were then passed, dark yellow in colour. At 6.20 p.m. patient complained of a feeling of sinking in the epigastrium, but without pain or tenderness in that part. She has, however, a sharp cutting pain in the right inframammary and hypochondriac regions, which is aggravated on taking a deep breath. There is no pain or tenderness in abdomen. T. 102°; P. 132, small, soft; R. 42, shallow, abdominal; breathing normal. She lies with her knees drawn up and with an anxious expression of countenance.

June 1.—Patient decidedly better this morning. Pain less, but she is suffering from diarrhæa.—6 A.M.: T. 100°.—10.30 A.M.: T. 99°·2; P. 104.

On the 2nd of June the temperature rose to 103°.4, but all the other symptoms were subsiding, and from this time the patient continued to get better, and left the hospital on July 1.

[Comments on these cases are deferred to the paper on "Anomalies in Typhoid Fever," at a later page.—Ed. Pract.]

DR. BOEHM ON THE PHYSIOLOGICAL ACTION OF HYDROCYANIC ACID, AND THE ASSUMED ANTA-GONISM OF HYDROCYANIC ACID AND ATROPINE.

WITH REMARKS BY THE EDITOR.

The Practitioner was, be believe, the first English journal that took any notice ¹ of the striking researches of Preyer ² (published in 1868) on the action of prussic acid and the antagonism which those researches appeared to demonstrate between prussic acid and atropine. So important were the results therein announced that it is somewhat surprising that a complete experimental criticism of Preyer's conclusions has not till now been attempted. Such a criticism now appears in a paper ³ by Dr. Boehm, which reports the results of researches made by himself and Dr. A. Knie in the physiological laboratory at Dorpat. We feel bound to give a somewhat full summary of these researches, which, among other differences, absolutely contradict the views of Preyer, viz., as to the antidotal power of atropine against hydrocyanic acid. The following is, with some condensation, the text of Dr. Boehm's paper.

For the proper explanation of our opposition (to Preyer) we must make some remarks upon the methods of research, and upon other apparently trivial points which cannot be ignored, because we must several times come into collision with Preyer with respect to them.

¹ Vol. i. p. 105.

² Die Blausäure physiologisch untersucht. Bonn, 1868.

³ Archiv f. Experimentelle Pathol. und Pharmakol., 17 April, 1874.

Our researches were mostly made on cats; the animals were often weakly chloralised, which process produces quiet and regular respiration without causing any abnormal extra effects. All the animals were tracheotomised.

Preyer used rabbits almost exclusively (34 times out of 38).

We procured the hydrocyanic acid from an approved pharmacy, officinal strength, viz., 2 per cent.; and always injected it, with a Pravaz's syringe, straight into the jugular vein. Preyer injected the acid in various places, and sometimes he applied it to the mucous membrane, or used inhalation. is some doubt whether he always exactly regulated his doses. Our method allowed of exact dosage: the only question being whether the officinal preparation is always correct in strength. We are at least sure that the dose of the poison we administered went wholly into the blood without change. Next to injection into the jugular vein, inhalation is the most rapidly effective method: and we found the application to wounds or to the subcutaneous tissues strikingly slower and weaker in effect. Preyer's opinion, that the effects of inhalation so rapidly induce the poisonous effects because the vagus-terminals in the lungs are thereby immediately brought into contact with the poison, is evidently incorrect, for this reason—that, as we shall presently show, the vagus plays no special part in hydrocyanic acid poisoning. The fact of the rapid poisoning by means of inhalation, however, is very simply explained when we reflect how large a surface for absorption is offered by the The readily diffusible poisonous gas is easily able. by this broad channel, to enter the blood rapidly and in large proportion.

Even beforehand it must be noted as a dangerous stumblingblock in many of Preyer's speculations and conclusions, that on the one hand he applies the various methods of administration promiscuously and without system, and on the other hand lays himself open to much reproach for inexactitude concerning doses. The weightiest of his conclusions must stand or fall according to the precision of the so-called "lethal dose." Nowhere in his work, however, is it even approximately specified for the individual modes of application, though it must obviously be various in these. His inexactitude in this

matter goes so far that doses which in one of his detailed researches admitted of the complete recovery of the animal, are described by him, in other researches on the same species and by the same method of application, as "surely mortal." The non-occurrence of the fatal result is here ascribed to the use of atropine, or to other influences. As justification for this severe imputation, we may point out that in one research the dose of two drops (2 per cent. acid), and in another research three large drops, is described as deadly, and the recovery of the animal which took place in these experiments is attributed to the operation of atropine; yet in two other researches we find that the animals completely recovered in an equally short time without danger. On other occasions, when Preyer really gave larger quantities of the poison, he again employed the most uncertain mode of application (to wounds), or speaks in general only of a "deadly dose," so that a check on him is in This may suffice to justify the assertion general impossible. that Preyer's detailed researches are by no means corroborative of his conclusions, but, on the contrary, directly contradict them.

The determination of the mortal dose of this poison was a matter of no difficulty in our mode of application: but it was necessary to operate on several animals for this purpose.

We avoided the use of chloral in these cases. It appeared that the strongest cats died certainly, and in a few seconds, when 0.2 c.c. of a 2 per cent. acid was injected into the jugular vein. (This represents about 0.002 gramme of water-free prussic acid.) In many cases death occurred after the administration of 0.1 c.c. or 0.15 c.c.; however, there were a sufficient number of instances in which strong animals recovered from these doses: but this was never the case when as much as 0.2 c.c. was given.

We may therefore well assume that this quantity of the poison in most cases exceeds the dose absolutely necessary to produce death: it was thence appropriate for administration in all cases where the object was to test Preyer's conclusions concerning the action of the vagus and the operation of atropine as an antidote. That we have not too far overstepped the necessary lethal dose is shown by the sufficiently frequent

recovery of animals from doses of 0.1 and 0.15 c.c. When it was possible, especially with strong animals, we gave even larger doses. That these doses, however, though certainly fatal when injected into the veins, were no longer certainly fatal when applied to wounds, to the subcutaneous tissues, &c., we had many opportunities of convincing ourselves.

Finally, as to the registration of our observations, this was accomplished, both in the case of the respiration and the blood-pressure, by graphic records on the rotating drum of the kymographion, so well known and so often described. The simple direct counting, which Preyer almost exclusively adopted, was never employed in our researches.

We turn next to the brief description of the alterations in the respiratory movements which were effected by various doses of hydrocyanic acid, since on this point, also, we cannot confirm all Preyer's statements. These differences, however, are for the most part incontestably due to the different species of animals employed.

The respiratory symptoms set in about three to five seconds after the completion of the injection of the poison into the vein. They begin thus:—After from two to four deep and laboured inspirations, a series of very rapid respirations occur, which sometimes last only five, sometimes fifteen or twenty seconds. the expiration exhibiting an altogether spasmodic character. The expirations, graphically reproduced by Marey's cardiograph, are not to be distinguished from those which, as Rosenthal has shown, are produced by weak irritation of the superior laryngeal No such thing as an inspiratory spasm could be detected. Up to this point the type of the respiratory acceleration was completely uniform, whether large or small doses of the poison had been given. Beyond this, however, things varied according to the dose. Poisoning with 0.2 c.c. (2 per cent. acid), as a rule, ends fatally immediately after the abovementioned rapid inspirations, in severe general tetanus. If the animal survives this tetanus, which is among the most constant symptoms in cats—and this is the case in all instances where the smaller doses have been given—there succeeds to the tetanic attack a pause of breathing, the length of which is proportional to the quantity of poison taken. In this pause the

thorax is in a state of equilibrium, and here also there is no trace of convulsive inspiration: the next movement of the chest, after such a pause, is always an inspiration, never an expiration, as it must have been if an inspiratory spasm had preceded. Even here, death may still supervene; in that case after several respirations, separated from each other by long intervals, a definite cessation of breathing takes place: usually without any recurrence of the tetanus. But if death does not occur, then the pauses between the respirations (which still show a remarkable excess of the expirations) gradually and constantly become shorter, and a point is reached at which the length of the inspirations is strikingly increased, though by no means more than the expirations. This crisis, however, so far from belonging to the true symptoms of poisoning, is a sure guarantee that the animal will recover completely. The respirations now become gradually and steadily softer, and more frequent: then comes a point when they exceed the normal frequency. We may then consider the animal completely recovered.

The most important point, respecting which our results differ from those of Preyer, and which cannot be explained by the different species of animals operated upon, is the absence of convulsive and tetanic inspiration in our observations. Only when animals which had been poisoned with very large doses died in tetanic seizures, did we find the diaphragm, on opening the belly, to be in the position of inspiration—i.e. in contraction. But this is equally the case when the vagi have been divided or left uninjured: therefore we cannot derive any support for Preyer's theory, which explains this occurrence by supposing centripetal stimulation of the pulmonary vagusterminals.

Section of the vagi we found, in numerous researches, to have no effect on the course of prussic acid poisoning, whether it were performed before or at the height of the toxic action. "Mortal doses" were mortal to animals with divided pneumogastrics; and non-fatal doses evoked the same general train of toxic symptoms as has been already described. Obviously, however, section of the vagi could not but modify the stage of recovery, because in convalescence the ordinary changes of

respiration which this operation produces necessarily came strikingly into view.

It remains to speak of the electric irritation of the vagi and laryngeal nerves during hydrocyanic poisoning, which gives us further support for the correctness of the above observations.

The effects of centripetal vagus-stimulation upon respiration are generally known since Rosenthal's researches. Weak irritation makes respiration more rapid and shallow; stronger irritation stops breathing in inspiration. If upon an animal poisoned with prussic acid (on whom the effects of strong and weak irritation have been tested in the unpoisoned state) this stimulus be applied in the stage of respiration interrupted by long pauses, so that it just falls in such an interval, no effect whatever ensues—the thorax remains unaltered, in the position of equipoise, which is unmistakable, both from the stillness of the indicating needle inserted in the abdominal wall below the diaphragm, and also from the registering cardiograph. is not till the recovery of the animal commences that the respiratory centre again becomes sensitive to stimulation of the vagus; and even now strong stimuli only produce, at first, increase and shallowing of the respirations, and it is not till later that the inspiratory spasms recommence. Moreover, stimulation of the superior laryngeal nerves, at the height of poisoning, has no effect.

From all these researches we gather, before all things, the certainty that the vagi are innocent of the respiratory disturbances which hydrocyanic acid produces; for all the characteristic phenomena occur in animals whose pneumogastrics have been divided. The idea of Preyer, that such animals die, not of asphyxia but of cardiac paralysis, is devoid of any foundation in fact: for we find the heart still pulsating when the body is opened immediately.

We believe, however, that the absence of results from centripetal stimulation most surely proves that the lesions with which we have to do in prussic acid poisoning are not peripheral, but central.

It is not so much an explanation as a shorter statement of the facts, if we say that this poison (after a short preliminary stimulation) either completely paralyses the respiratory centres in the medulla oblongata, or depresses them to a minimum excitability, which, with the gradual vanishing of the poison from the blood by degrees, gives place again to the normal condition. It is in the highest degree noticeable, that where large but not rapidly mortal doses are acting, the centre always remains—though weakly—sensitive to the stimuli normally contained in the blood (want of oxygen or carbonic acid), as is evidenced by the occasional inspirations, whilst artificial electric irritation of the vagi cannot stir it up to action.

Researches undertaken by the author (Boehm) alone upon the effect of prussic acid on the organs of circulation have led to the following conclusions:—

If one observes the blood-pressure and the pulse in animals whose circulation has been rendered (by artificial respiration and curara) independent of voluntary movements, of spasms, &c., one sees that with medium doses of hydrocyanic acid (0.1 c.c. of 2 per cent. acid in cats), as a rule, only transitory changes occur. The blood-pressure experiences a slight but very brief increase, and sinks from this rapidity to about the half of the normal, and comes back in a few minutes to the The pulse-frequency simultaneously undergoes (an normal. often very remarkable) diminution, which occasionally much outlasts the changes of the blood-pressure. Doses which. otherwise, kill animals quickly (0.2 c.c. of 2 per cent. acid), are, in this manner of experimenting, frequently only followed by the above described transitory effects on the circulation. But if on a similar animal the dose be repeated after a restoration to the normal state, or the original dose given be larger (0.3 c.c. of 2 per cent. acid), the scene is changed: a swift fall of the blood-pressure (to the level of blood-pressure when the cervical part of the cord has been divided) ensues; and simultaneously, again, a very great reduction of the pulse-frequency. If artificial respiration be continued long enough, things may come round in ten or twenty minutes to the normal state, if not more than 0.2 c.c. had been employed.

Stoppage of the heart, in the commencement of the toxic action, or later, we could never observe, although this must have exhibited itself in the kymographic tracing of a curarised animal in the most marked way. It was striking to us, how

long the heart remained active even after the abolition of the other functions. All these phenomena are entirely independent of the vagi (i.e. of their central influence), and occurred equally with divided and with uninjured pneumogastrics. Further on we shall mention other discoveries, which make it most highly probable that the vagus-terminals in the heart are concerned in this.

The institution of the same researches on animals who have been tracheotomised, but not curarised, might throw further light on the relations of the vagus; for our curara possessed the property of mollifying the excitability of the vagi to the induced Immediately after the injection of prussic acid, the artificial respiration was begun, and the pulse and blood-pressure were observed anew. The result was an almost absolute identity of the phenomena with those above described; the important symptoms were sinking of the blood-pressure and slowing of the pulse. If the vagi were peripherally irritated during the comatose stage, in which all reflex acts were suspended, the ordinary operation took place; moreover, its cardiac terminals were not paralysed by hydrocyanic acid.

The most weighty phenomenon appears to be the diminution of blood-pressure, which, as is visible in our tables, always set in and reached a very advanced grade. To it, and not at all to paralysis of the heart, must we finally refer the death of those animals which were protected from asphyxia by artificial respiration; for the heart is active to the last, and all its parts contract. The diminution of pressure, however, can hardly be explained in any other way but by a paralysis of the vasomotor centre, if we can exclude on the one side the vagus influence and on the other side paralysis of the heart, as we can in this case. There is, further, another possible explanation, if we weigh the above comparative results of researches on respiration, and cast our eye back upon the paralysis of all the other functions of the central nervous system (motility, sensibility, reflex irritability, sensorium). It would be a strange thing indeed if, with all this, the vaso-motor centre continued its functions. We answer that we cannot produce direct proof of the paralysis of this centre, but we believe there is, nevertheless, the highest degree of probability for it.

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The transitory rise of blood-pressure at the commencement of the poisoning, as the expression of a passing stimulation of the vaso-motor centre, agrees equally well with the analogous condition of the respiratory centre; as the gradual rise, again, of the pressure under continued artificial respiration, with the gradual resurrection of the respiratory activity in the stage of recovery. According to this, it appears that these neighbouring central organs are affected by prussic acid in an altogether analogous manner.

The slowing of the pulse hardly demands, then, any further explanation. It increases regularly, as we know, if the pressure sinks below a certain level; possibly it may also be in connection with the accelerating (cardiac) nerves, the origin of which must be sought in the central nervous system.

The researches which we have made on the effect of artificial respiration in prussic acid poisoning have shown that the statements of Preyer on this point are in the main correct, although they do not confirm the dictum that this remedy will avert death in all cases where the heart still beats. In poisoning with our "surely fatal" dose (0.2 c.c. of 2 per cent. acid) we only once saved an animal; whilst in two other cases death ensued upon a constant fall of the blood-pressure. After poisoning with smaller doses (0.1 c.c.) recovery was a perfectly regular event. It was striking to us, by the way, that the return of voluntary breathing took place long before the return of reflex irritability, whilst activity of breathing and rise of blood-pressure ran exactly parallel.

Finally, as regards the antidotal action of atropine, we must, in consequence of our researches, contradict it in the most distinct manner. We have already indicated the foundation of Preyer's mistake upon this point. We might well wish for more numerous and secure supports than Preyer has given for a fact of such far-reaching importance. The researches 4, 5, and 9, collected in our appendix, are selected out of a great number of experiments with similarly negative results. The explanation why atropine can be no antidote to prussic acid makes itself obvious in the above remarks.

We can now conclude our contribution with the following resume:—

- 1. The operation of prussic acid is directed upon the central nervous system, whose functions are annihilated by large doses, after a brief excitement or increase.
- 2. The lesions of respiration and circulation arise from analogous changes in the activity of their centres in the medulla oblongata.
- 3. The vagus plays no part, either in the effect of prussic acid on the respiration, or in its effect upon the heart.
- 4. Atropine is not an antidote to prussic acid. The only rational treatment of this poisoning is the persevering performance of artificial respiration.

How the results of our researches agree with the physiologicochemical operation is a question for whose decision further researches must be made, but the solution of which is, we believe, simplified by our physiological discoveries.

(Here follow complete "Versuchsprotokolle," or detailed and tabulated descriptions of all the authors' experiments.)

[The above paper by Dr. Boehm seems to us of very high practical interest and importance. As confirming, at least partially, Preyer's assertion as to the possibility of reviving animals poisoned with prussic acid, by means of artificial respiration perseveringly carried out, it deserves very careful attention. And, on the other hand, if the antagonism of atropine does not exist, the sooner this is known the better. Considering the justly high reputation as an experimenter which Preyer holds, we are not prepared to accept as final the decision now pronounced by Boehm against the antidotal power of atropine.

Certainly, however, we are not particularly inclined to believe that hydrocyanic acid acts solely or mainly as an exciter of the vagus. If that were so, it would not have been possible for us to note, as we have repeatedly noted, in accordance with Boehm's observation, that animals dying, even quite suddenly, from a large dose of the acid, while lying perfectly motionless and flaccid, and to all appearance dead, may still exhibit very distinct cardiac pulsation for as much as twenty or twenty-five minutes. And, indeed, the general toxic picture presented by an animal rapidly poisoned with prussic acid is far enough from conveying the idea of an intoxication so singularly limited as

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Preyer would have us believe. The protruded, tense, and glistening eyeballs, the dilated pupils, and the foam at the mouth, seem to speak unequivocally to a powerful action on the encephalic centres.

In short, we must say that while Preyer's recommendation of artificial respiration in prussic acid poisoning is now strongly corroborated, the antagonistic action of atropine has been for the moment seriously discredited, if not altogether overthrown.

—Ed. Pract.]

NOTES ON THE NITRITE OF AMYL

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In June 1873, when administering the nitrite of amyl to a girl who was in the status epilepticus and had been unconscious for some hours, I was much struck by the fact that in about a minute after the inhalation was commenced there was what may be called an attack of yawning. The patient yawned profoundly and repeatedly. Never having before witnessed yawning during a state of coma, it at once occurred to me that that modification of respiration in this case must have been induced by the nitrite of amyl, which always when inhaled hastens and deepens breathing. That inference I was able to corroborate forthwith. Whenever the inhalation was interrupted the yawning ceased, whenever it was resumed the yawning In another case of the status epilepticus, which recommenced. occurred about a month afterwards, similar phenomena were observed. The patient, although so completely comatose that no responsive movements followed upon tickling the soles of the feet or pricking the toes, immediately yawned in the most ordinary way, as if just upon the verge of much-needed sleep, whenever a piece of lint soaked in nitrite of amyl was held before the nose and mouth. When that was done, two or three full inspirations were succeeded by one of extreme depth. accompanied by depression of the lower jaw and elevation of The experiment was repeated many the ribs and scapulæ. times, until it was quite evident that the crowning expression of drowsiness was induced by the nitrite of amyl. Some months

later, Dr. Herbert Major again noticed yawning in a general paralytic patient, who was quite unconscious and at the point of death, and to whom he was administering the nitrite of amyl with the view of securing a temporary rousing. More recently, on the 24th of July last, the same effect of the nitrite of amyl was seen well exemplified. Two male patients were at that time prostrated in the status epilepticus: one of them, M. C., had passed through some hundreds of fits in the course of three days, and was permanently unconscious and much exhausted; and the other, J. A. M., had had nineteen fits in twenty-four hours, and was in a condition of stupor, taking no notice of what was going on around him, and making no spontaneous movements. At 2 P.M., nitrite of amyl, which had been tried at the beginning of the outbreak without perceptible benefit, was again given as an inhalation to M. C., who was then in extremis, lying with livid features, pin-point pupils, a pulse of 116 and a temperature of 102°, and breathing stertorously. inhalation had gone on for fifteen seconds, there was a voluntary movement of the right hand and an attempt to raise it, and this was speedily followed by acceleration of the respiratory movements and then by distinct yawning. The patient yawned six or seven times consecutively and prodigiously, and then turned his head and emitted a kind of sob. While the yawning was going on the pulse was somewhat quickened, and a dull flushing of the head and face became visible. The flushing travelled about half-way down the neck, but not further, and no blotches appeared on the chest, abdomen, or limbs. minutes after the inhalation a copious perspiration burst out over the forehead, face, and neck. At the same time an inhalation was administered to J. A. M., who could not be awoke out of his heavy slumbrous torpor. In ten seconds he likewise moved his right hand, and in fifteen seconds he likewise began It would perhaps be more correct to say that he manifested a tendency to yawn. He opened his mouth to the widest possible extent several times in succession, but with that movement there was no prolonged inspiration, no raising of the shoulders, and no characteristic sound. With the movements of the jaw came obvious flushing and considerable reanimation. The patient looked about him, lifted his head

from the pillow, and seemed more alive to surrounding circumstances than he had been for twenty-four hours previously.

Two days subsequent to these observations on M. C. and J. A. M., my colleague, Dr. Merson, who had witnessed them, was administering the nitrite of amyl to a retriever dog that had been in continuous convulsion for some hours, when he was much surprised to notice in it precisely the same movements that he had seen in J. A. M. Whenever the amyl was held before the nostrils of the animal, which at the time was quite unconscious, it beat the ground with its fore-paws, and opened and closed its mouth with rhythmic regularity. To make quite sure that these movements were not accidental or due to some other cause, Dr. Merson interrupted and resumed the inhalation many times. He found that invariably when it was resumed after an interruption these movements occurred, and that they were not induced by other kinds of stimulation.

These phenomena, as observed in the dog and in patients in a state of coma, seemed to me to be highly interesting, and to point to some hitherto unsuspected action of the nitrite of Having administered that agent to hundreds of patients in a state of consciousness, I had never seen yawning included amongst its effects; and having searched its literature, I found no record of any such action having been produced by it. That the yawning, complete or partial, in the cases described, and in the dog, was really ascribable to the nitrite of amyl, is evident. I think, from the nature of the observations made and referred to, as well as from the general observation that yawning is not known to occur in states of coma or unconciousness due to disease in which nitrite of amyl has not been administered. Arising ordinarily out of a sense of fatigue or an oppression of the respiratory organs, it does not occur during morbid fatigue nor pulmonary engagement. I have watched innumerable cases of coma with great exhaustion, and every degree of lung congestion, and in none of them except those in which the nitrite of amyl was used have I seen yawning. That the vawning was due to some specific effect of the nitrite of amyl. and not to a mere general stimulation of the pulmonary mucous membrane under certain conditions, is deducible from the fact

that other stimulants under like conditions do not produce the same effect. Thus chloroform, ether, and ammonia, given by inhalation in states of coma, do not bring on yawning as the nitrite of amyl does.

Curious to trace out further the action of the nitrite of amyl when inhaled during unconsciousness, I have during the past month administered it in this way to eighty-seven persons when sleeping, and to many of these upon several occasions. difficulties of course obstruct the attainment of any definite results in this way, as the most general and immediate consequence of the inhalation of the nitrite of amyl during sleep is sudden waking. At the moment that the blush appears upon the face, the person operated upon starts up, makes a number of voluntary movements, and having passed through a few seconds of bewilderment, not unnatural after so rude and extraordinary an interruption of repose, is fully alive to all that is going on around. With great care, however, and the use of small quantities of the nitrite, the inhalation may be carried out and its full effects developed during the continuance of sleep. My most successful observations have been made upon epileptic patients who sleep heavily and are not easily disturbed. Altogether I have been able to make fifty-seven satisfactory observations; that is to say, I have succeeded fifty-seven times in administering the nitrite of amyl without waking the patient, and in noting the effects which followed the inhalation. It will certainly be regarded as remarkable that in forty-two out of these fifty-seven observations there were recorded distinct movements of the mouth consentaneous with blushing of the countenance. In only one out of the forty-two observations in which movements of the mouth are reported did yawning occur. That observation was made upon a lad who was attacked by a severe fit when asleep, and to whom the inhalation was administered about five minutes after the fit, while his features were still livid and his breathing stertorous. No sooner had the flush overspread his face than he turned upon his back and yawned to the top of his bent five times, then falling again into a heavy sleep. In none of the other forty-two observations is yawning recorded, but in all of them movements kindred to yawning were noticed; that is to say, in all of them there were movements of the

- mouth. These movements were exceedingly various, the most common, however, being a short munching movement of the lower jaw, which was depressed and elevated as if in the act of chewing. The next most common movement was a smacking of the lips, as if in the act of tasting. It will perhaps be as well to quote from my note-book a few illustrations of the movements observed. In twenty-eight of the successful observations, movements of the hands, antecedent to or contemporaneous with those of the mouth, were noted.
- 1. Mary C., epileptic, M.5. In twenty seconds, deepened breathing; in thirty seconds, distinct flushing; in thirty-five seconds, extension of both hands; in thirty-eight seconds, munching movement of lower jaw and movement in throat, as if swallowing was going on.
- 2. Ann W., epileptic, m8. In ten seconds, deepened breathing; in fifteen seconds, slight flush; in twenty seconds, deep flush; in sixty seconds, munching movements of the lower jaw, kept up for thirty seconds, when sudden waking occurred.
- 3. Emily L., epileptic, M10. In five seconds, deepened breathing; in nine seconds, flush, and the right hand suddenly raised above the head, after which munching movements of the lower jaw began.
- 4. Elizabeth W., epileptic, M15. In ten seconds, quickened breathing; in twelve seconds, movement of right hand; in fifteen, distinct smacking of lips, continued for some time.
- 5. Jane A., epileptic, M.5. In twenty seconds, deep flush, then short cough, then smacking of the lips.
- 6. James G., epileptic, M10. In ten seconds, flushing of the face; in fifteen seconds, retraction of the lips, then loud grinding of the teeth.
- 7. Paul G., epileptic, M10. In ten seconds, deepened breathing, becoming audible and stertorous, then movements of the lips, then swallowing, and then muttering and mumbling.
- 8. Job L, epileptic, M5. In ten seconds, deep flush, with blowing movements of the lips, followed by movements of the hands.
- 9. Thomas H., epileptic, M5. In five seconds, deepened breathing; in ten seconds, smacking of the lips, with movements of the hands, after which he turned over in bed.

10. Thomas W., epileptic, m 5. In ten seconds, hand raised to head, over which it made a rubbing movement; in fifteen seconds, munching movements of mouth.

The same patients in whom these movements were observed were also caused to inhale during sleep ether and aromatic spirits of ammonia, with the view of testing whether other stimuli applied to the respiratory tract would induce like movements. It was found that ether, cautiously administered, merely deepened sleep, without producing any movements whatever; and that when movements were occasioned by it, these usually commenced round the eyes, and not the mouth. Ammonia always awoke the patient, the first movement being a sudden and violent toss of the head backwards.

As the result of these observations, it appears that nitrite of amyl, when inhaled during a state of unconsciousness, has a specific action upon the motor centre of the mouth, and calls into action, by preference, the muscles of the lips and lower The mode in which it performs this action, whether reflexly or through the agency of the vaso-motor apparatus, is as yet only a subject of speculation. The fact that the movements which it evokes are consentaneous with the appearance of flushing of the face, gives probability to the latter hypothesis; while, on the other hand, one observation, that when administered hypodermically the nitrite failed to induce yawning in a case in which it had induced it when inhaled, seems favourable to the other view. But whatever may be the explanation of the action in question, there can be no doubt that it is a significant fact, and worthy of further investigation.

SOME OBSERVATIONS ON THE LOCAL ACTION OF IPECACUANHA.

BY DR. NOËL GUÉNEAU DE MUSSY,

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THE root of ipecacuanha has been for several centuries reputed one of the best remedies in many cases of acute dysentery, and indeed such faith has been put in it that the name of *Radix* anti-dysenterica was one of its first appellations.

When ipecacuanha is given for dysentery, the method called Brazilian is the mode of administration which prevails generally amongst French physicians. They give it in small doses, boiled or infused in hot water.

In many cases, and more especially when dysentery is complicated with gastric symptoms, which is very commonly to be observed, I have found it useful to begin with liberal doses so as to obtain the effect of an emetic, and it is not till later that I give it according to the Brazilian method, in the form of decoction or of ipecac. syrup: one teaspoonful of the latter every two or three hours.

Lately I had under my care an American gentleman who in a very severe attack of dysentery was not relieved after six or seven days' use of decoction of the root mixed with opium according to the prescription of a naval surgeon. Other kinds of treatment had also proved ineffectual; and though I found him very weak and exhausted by protracted dysentery, as he complained of nausea, and as his tongue was thickly furred, I prescribed ipecacuanha as an emetic, to be followed, after vomiting, by small doses of the syrup. This was attended by immediate relief, and the patient's health was soon restored.

In chronic dysentery, and even in common chronic diarrhæa, injections of decoction of ipecacuanha into the intestines are a common practice in Peru and in some other countries of South America.

I have used this remedy with success in some cases of diarrhoea unchecked by other means. My formula is thus:— Ipecac. root, 3j; boil for ten minutes n water, 3v. Let it infuse for one or two hours, strain off, and make use of the decoction as an enema.

Habitually, this enema is wonderfully well tolerated. No painful sensation, no irritation of the bowel, attends these injections in the greater number of cases. They can be retained for several hours without any difficulty, and even, occasionally, with a feeling of comfort and relief.

This successful result of the local application of the decoction in enteritis induced me to try it in some other inflammatory affections of mucous membranes.

In the beginning of the year 1872 I received into my wards a newborn female child, eighteen days old. She looked very poorly fed, was thin and wan, and her limbs were cold and blue, though no anomaly could be detected in the central circulation. From the red, closed, and swollen eyelids oozed a muco-purulent matter, which, flowing on the cheek, irritated by its contact the skin around the eyes and the naso-labial grooves.

The eyelids could only be raised with great difficulty, and, on doing so, the mucous lining would protrude outwards—scarlet-coloured, swollen, velvet-like, between the streams of purulent matter which escaped from the surface of the eyeball.

The left cornea was dull, rough, deprived of its brightness and transparency. A small ulceration, of the size of a millet seed, occupied the central part of it. A light whitish cloud darkened all the surface of the right cornea.

The child's mother was weak, anæmic, but free from any venereal contamination.

I prescribed the treatment which for more than thirty years I have scarcely ever found to fail in purulent ophthalmia of newborn children. An injection was ordered to be made every hour with a solution of two grains of nitrate of silver in three-

and-a-half ounces of distilled water. Four times a day a stronger solution, containing the same quantity of the nitrate to one ounce only of water, was to be instillated.

The state of the eyes greatly improved, and the acute symptoms subsided. The purulent secretion was almost entirely dried up; but the inflammatory process was not quite extinguished. The conjunctiva remained swollen, red, and slightly granulated. The cornea presented the same appearance. I touched it with a crayon composed of equal proportions of nitrate of potash and nitrate of silver. But no change took place in the condition of the affected parts. The ulceration and the opacity of both corneæ remained unmodified.

After four days of useless applications of this remedy, it occurred to my mind that decoction of ipecacuanha, which had proved so useful in sub-acute inflammation of the bowels, might be successful in this case.

So I prescribed four times daily an instillation to be made into both eyes with the following decoction:—Ipecac. root, 3ss.; water, 3v. Boil for ten minutes, and when cool, strain off.

The application of this topic seemed at first rather painful: the child winked, frowned, and cried after each instillation. But it soon got accustomed to them, and the affected parts were speedily modified. After twelve days the granular appearance had disappeared; the conjunctiva recovered its natural colour; the right cornea was quite healthy; only slight opacity was to be observed in the left; and after some days the baby left the Hôtel-Dieu entirely cured.

I related this observation to my learned friend Dr. Galezowsky, who tried the remedy in the same conditions of subacute inflammation, and in several cases with success.

ON THE DIFFERENT ACTION OF INDUCED AND CONSTANT CURRENTS ON THE ECONOMY.

BY DR. ONIMUS, OF PARIS.

INDUCED and constant currents are employed in medicine, and if some medical men have held and still hold that there exists no difference between these two methods of electrisation, others, on the contrary, and especially those who within the last few years have investigated the question scientifically, assert that there exists a notable and incontrovertible difference between the two sorts of electric currents.

As to myself, on the strength of physical facts and of physiological and clinical observations, I have sought, from my very first researches on the subject, to determine the nature and mode of action of both kinds of electricity. These ideas are now generally accepted, but only a few years ago this question was still a very vexed one.

Historically, we know that currents proceeding directly from the electric machine were employed immediately after Volta's discovery; but induced currents, on account of their powerful effects and the handiness of the apparatus, soon superseded direct currents.

Hiffelsheim in France, and Remak in Germany (the former preceding shortly the latter), redeemed the honour of constant currents, which since have held their place in therapeutics.

From the year 1866, I have sought, in co-operation with my regretted friend Legros, to determine, first, the physiological effects produced by both sorts of electric currents, and, afterwards, to apply these principles to pathology. With an impartial and unprejudiced spirit, we instituted new experiments, and repeated all those that had been already made,

especially the ones which had given rise to the electro-physiological theories, and which were generally admitted at that time.

Except the works of Becquerel and Matteucci (works which the German electro-physiological school ignored), all the other researches made by physiologists had only one object, that of completing the theory of Du Bois-Reymond, which prevailed everywhere and was taught in all schools.

After having repeated the experiments upon which Du Bois-Reymond and his followers based their theory, and having confronted them with the facts observed by Becquerel and Matteucci, we came to the firm conviction that the whole science of electrotonus, and all the theories of nerve and muscular currents, did not deserve the importance put upon them.

All the phenomena observed may be explained by the fact that all organic tissues, whatever they may be, give rise to an electric current, the direction of which depends upon the difference in oxidation of the two points connected by the galvanometer. Moreover, electrolytic phenomena always occur through the passage of a current, however short and weak it may be; on the other hand, derived currents are formed on every passage of a current, and, immediately after the rupture of the current, there occur currents of polarisation whose action, often very energetic, is the cause of the phenomena observed.

It is thus that may be explained, by physical laws, the principal facts upon which the electro-nervous theories of the German school were grounded.

Obviously, there are still other modifications of currents upon nerves, which arise because nerves are not only an organic tissue, but a living substance of exquisite sensibility, reacting functionally under the influence of the slightest impression. It is from this point of view that we have endeavoured to make out the differential action of the direction of currents, of their intensity, mode of propagation, duration, and intermittences.

Almost all researches of electro-physiology were connected with the action of electricity on the nervous system and on the system of striated muscles. I have endeavoured to complete this investigation by studying the action of currents on circulation, general nutrition, and smooth muscular fibres. Here again are to be found most marked differences between the two sorts of currents.

This difference naturally exists in clinical observation, and I will endeavour to sum up its principal laws, founded not only on physiological data, but also on the pathological facts which I have observed, and on the various works published in France and abroad.

I.—On the Physical Differences which distinguish INDUCED CURRENTS FROM CONSTANT CURRENTS.

It is impossible to form an exact idea of the therapeutical differences afforded by induced and constant currents, without a knowledge of the physical differences which exist between the two kinds of currents.

Undoubtedly, electricity is one; but, most especially from a medical point of view, we must take into account the differences which it presents, according to its source and to the modifications which it undergoes in traversing bodies. Like every kind of molecular movement, electricity undergoes a series of metamorphoses and presents itself to us with different properties. In the same way as the heat of the boiler is transformed, through special mechanism, into mechanical work, so the chemical molecular movement of the voltaic pile is transformed, externally, into chemical, mechanical, and calorific effects. Moreover, whereas heat is in itself a force which is always identical, electricity has already in itself most notable differences according to its origin.

And indeed every electric current must be considered according to these two properties: (1) Tension; (2) Quantity,—both of which, in variable proportions, form integrant parts of every electric current.

I cannot to any extent insist in these pages on the special phenomena which answer to tension and quantity. I must only say, in a general way, that tension corresponds to the force of penetration and to the power of the electric current, whilst quantity corresponds to the energy of chemical action.

These two elements vary already in induced currents, accord-

ing to several conditions, such as the largeness and length of the wire of the bobbin, and, in a preceding publication, I have already had occasion to show that even the nature of the wire has a great influence in this respect. The physiological and therapeutical applications are evidently different according to the induced current employed, and if this difference exists between induced currents themselves, we can easily understand that it must be enormous between induced and constant currents.

And, indeed, what differentiates above all things induced from constant currents, is the fact that the former possess very great tension compared with their chemical action, whilst the latter have less tension and much greater chemical action.

This difference is most important in physical sciences; it dominates absolutely all the applications of electric currents. But there are many other differences between constant and induced currents, which are perhaps of minor importance from a purely physical or industrial point of view, but which are essential from a medical point of view.

These differences depend on duration, direction, localisation, and excitation.

Duration.—An induced current is always of very short duration. The molecular movement which it produces is always rapid and sudden. It is 0".0042, for the opening current and 0".0114 for the closing one.

The time during which electric excitement takes place is therefore very short.

With constant currents, it is impossible, at least in practice and with our ordinary apparatuses, to obtain such a short time of action. The duration of action of constant currents is always at least a twentieth of a second.

As the excitement of the muscle or nerve depends mostly on the rapidity of variations in the intensity of the current, it follows, evidently, that the excitement produced by induced currents is much stronger than that determined by constant currents.

On the other hand, in certain cases where nerves and muscles have lost excitability, it takes a prolonged action to excite them; and in these cases, constant currents have a more decidedly marked action than induced currents. And it is indeed just what we observe in certain cases of peripheric paralysis.

Direction.—We know that in every bobbin the current produced at the moment of entrance is in inverse direction to the one produced when the current ceases. There exist, therefore, at every contact of the trembleur, or whenever induced currents are produced, two currents having a different action. The induced current, which takes place at the time of the closing of the circuit, has a direction opposite to the current of the pile, whilst the one produced at the moment of cessation of the current is in the same direction with the current of the machine.

These two currents differ again through their intensity: the opening one is the more energetic; its strength compared to that of the closing current is as 6 to 1.

With constant currents, on the contrary, we act by means of a current having always the same direction, and distinguished by this important particularity, that it always has a determined and definite direction. It circulates from the positive to the negative pole; or, rather, it forms a continuous circuit, going from the positive to the negative pole, and returning from the latter to the positive.

There is in this circulation of the current a real material transfer, which can be easily demonstrated. If you separate two vases, filled with the same liquid, by a porous membrane or a porous vase which in the ordinary state permits of the establishment of an identical level on both sides, and if you pass a current through the liquids, putting the positive pole in one and the negative in the other, you observe immediately that there exists a difference in the level in favour of the liquid into which the negative pole is introduced. Therefore there exists a transfer from the positive to the negative pole, and this transfer takes place, as I have often been able to convince myself, notwithstanding the phenomena of endosmosis.

In the inside of the pile, the material transfer takes place in the contrary direction, and it is easy to understand the phenomenon by means of the following small apparatus—(I had thus got a series of piles constructed, for medical applications of constant currents but was compelled to renounce them on account of the fragility of the tubes). A M B figures a U-shaped tube, at the bottom of which, at M, is put a layer of papier-maché or fine sand. At A is a copper wire, coiled upon itself, and at B a small plate of zinc. By putting in the A side of the tube some copper crystals and some common water, an ordinary sulphate of copper pile is formed. As long as the current does not pass, the level of the water is the same at A and B; but as soon as the current is established the level ascends to

A' and falls to B'; meaning that in the inside of the pile the material transfer is effected from the zinc to the copper.

There exists consequently a continuous circuit in the current of the pile. It has a determined and definite direction, which, furthermore, has the property of carrying along with it the material parts which form the circuit. I must insist on these points, as the human body is a bad conductor of electricity, and this action of transfer is the more marked as the current passes through bodies which offer a greater degree of resistance.

At any rate, whereas induced currents determine, whenever they are produced, currents of inverse directions—constant currents, during the

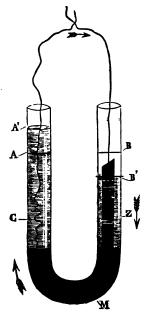


Fig. 1.

whole time of their application, only have one and the same direction.

Localisation.—Induced currents penetrate deeply into the tissues on account of their great tension; but, somewhat in contradiction with physical laws, constant currents, notwithstanding their weaker tension, have a more extensive and deeper action.

I have already often insisted on this diffusion of constant currents. In rather large animals, I have witnessed deviation of the needle of the galvanometer communicating with wires

introduced into the posterior limb, when the current was made to pass through the anterior limbs. We observed these facts in 1868, and since then M. Helmholtz, in 1870, has noticed the "Recent experiments," he wrote, "on the same results. transmission of excitation in nerves, have drawn my attention to the fact that the intermittent currents of electric induction produce slight effect on nerves situate rather deeply in the human body, whereas it is easy, by means of a pile of from ten to twenty elements of zinc and platina, to excite violent commotions and even tetanus in the same nerves. the electro-motor power of an induction apparatus giving forth small sparks between the approached extremities of the induced coil is far greater than that of a pile of ten or twenty elements, which never produces visible sparks when the current is closed."

Since then I have had occasion to repeat these experiments at the Hospice de la Salpétrière, on female patients affected with anæsthesia. By introducing platina needles into the fore-arm, and after allowing the needle to revolve to zero, we obtained marked deviation, in electrising with constant currents the upper part of the neck and even the shoulder of the opposite side.

This experiment affords us a proof of the diffusion of electric currents, and shows that in organic tissues the influence of a galvanic current extends in all directions, and is never limited by the two electrodes.

I will remark, furthermore, that in comparing this phenomenon with that which Du Bois-Reymond has called electrotonus, and which he wished to make an exclusive property of nerves, it is easy to see that a great analogy exists between them. This is an additional proof of the mistake which consists in admitting a peculiar electric state for nerves.

To sum up, induced currents may be easily localised, whilst it is not the same with constant currents.

Excitation.—Excitation, or in other words the direct action of electric currents on muscles and nerves, is far from being identical in constant and induced currents, and this difference exists even when we consider solely the excitation which takes place at the time of opening and of closure of induced or constant currents. Thus, I will first mention the

differences which exist between intermittent constant currents and induced currents, and only afterwards I will appreciate the differences which result from the continuity of currents.

The greater number of medical men fancy that interruption in induced currents, and continuity in constant currents, is the only difference which distinguishes these two sorts of electric currents. It is not so, however, and interrupted constant currents have different properties from induced currents, which are also occasionally called interrupted currents.

We have already seen that induced currents have an excessively slight duration, that the opening induced current only acts during 0 0042 of a second, whilst the shock of the opening or shutting of the constant current always lasts a longer period of time. When by artifices of construction we modify the interruption of induced currents, so as to render it less sudden, or when we make use of magneto-electric apparatuses, where the formation and cessation of the current take place gradually, excitation of the nerves is always less strong and less intense.

Thus, the shorter the duration of a current, the more intense is the degree of excitement produced. The fact is explained by a law of electro-physiology, that excitement of a nerve or muscle depends less on the absolute value of the tension of a current than on the modification of that value from one moment to another.

It is in this property that we must seek the energetic action of induced currents; they form and vanish with extreme quickness, and consequently they rapidly and abruptly alter the molecular condition of nerve and muscle.

On the contrary, in certain cases a current of very short duration will no longer act on nerves or muscles whose excitability is diminished and can only be awakened by excitement of long duration. So, in these cases, whilst induced currents excite no contraction, constant currents still excite a most manifest action. We shall shortly see that in certain affections it is partly to this cause that must be attributed the different action of induced and constant currents.

On the other hand, with our ordinary apparatuses, the excitement determined by induced currents is never simple, as it is

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formed by the shutting current and the opening current, which follow upon each other so rapidly that they are almost always confounded.

With the current of the first coil or extra current, the shutting current is excessively weak, and may be neglected, but it is not so with the current of the second coil. There exists therefore, from this point of view, an important difference between the current of the first coil and that of the second, and this difference evidently exerts an influence on physiological and therapeutical action, and has not until now been duly taken into consideration.

This double excitement is demonstrated beyond doubt when a certain interval is put between the shutting and opening of the current, and especially when the contraction of a fresh and unfatigued muscle is registered. The accompanying figure

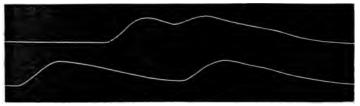


Fig. 2.

represents the contraction produced under the influence of an induced current. The superior line was obtained with a current of middling rapidity. The two summits determined by the two successive contractions produced, one by the shutting current, the other by the closing one, can be very clearly distinguished. The inferior line represents still more distinctly these two contractions, as the interval of time between the production of the two currents was increased, so that each excitoment received its proper action.

In order to obtain these traces, it is of very great advantage to make the interruptions with a metronome, or with an induced apparatus with regular interruption, such as the one I had constructed for my physiological studies on the pneumogastric.

This double excitement has a great influence in practice; as the nearer the two currents are brought together, the more vivacious and painful is the impression produced on nerves and muscles.

In the same order of researches I have been able to demonstrate by means of these electric apparatuses, in which I could regulate mathematically the number of interruptions, that there is a very great difference in muscular sensation and excitement according to the number of currents produced in the same space of time.

Thus, an induced current which is very painful when there are 10 to 25 excitations a second, becomes very tolerable when only from one to five interruptions are made every second. With one interruption per second, the strongest currents can be easily endured, and we can understand how fortunate this is when we wish to examine the state of muscular contractility in very irritable persons or in children.

The influence of the number of interruptions is most important in physiological researches. It is thus, as I discovered in relation to the pneumogastric nerve (Recherches expérimentales sur la Physiologie des Nerfs pneumogastriques, in the Journal d'Anat. et de Physiol., November 1872), that decrease in the tension and diminution in the number of beatings of the heart is the more considerable as we augment the number of intermittences.

If we consider now the differences which exist between induced and constant currents during their passage, we find that they are so very marked that no confusion is any longer possible: The induced current only acts during the infinitely short time of its passage, after which everything returns to order. duces at every instant of its passage a more or less intense excitement and determines a sort of molecular shock. It seems needless to insist on these facts, with which we are all acquainted, and we cannot assimilate an induced current, as some medical men have done, to a constant current, through the fact alone that the sensation experienced with one or other current is the same or appears to be the same. This means of comparison is always attended with error, and medical men especially should remember that our sensations are often false, as, for instance, when extremecold and strong heat both give the same impression. At any rate, an induced current, however slight it may be, or however

rapid the interruption may be, can never be anything else but a series of slight excitements.

The application of constant currents has the result of determining real excitement only at the time of shutting and of opening of the currents; during all the time the current is maintained, the molecular state of nerves and muscles remain in equilibrium. It is during this silent period, when nothing seems to act, when the organs are in apparent rest, that the principal action of the continuous current makes itself felt in the depths of the tissues; it is during this period that are produced electrolytic effects, phenomena of transferment and influences of orientation, all which things never exist with induced currents.

All these differences will be again found in the clinical applications of electricity, and I will then have occasion to show their various consequences.

On the differences of action of Induced and Constant Currents on organic tissues considered as conductors.

Besides the differences which I have just pointed out, and which depend on the source and mode of production of electricity, it remains for me to examine briefly the modifications experienced and determined by the various currents on their passage through the tissues.

The human body is formed by liquid or semi-liquid substances, the *ensemble* or collection of which offers much resistance to the passage of electric currents. These latter, according to their nature, act diversely on the resistance and on the chemical phenomena presented by the system.

Induced currents, having a great tension, will cross the tissues very easily and determine a molecular shock, but will exert no chemical action; their influence being reduced, so to say, to mechanical action.

As to constant currents, they not only exert a very marked chemical action, but they are attended by the phenomena which we observe when a current is thrown through a resisting body. If we compare, for example, the resistance of the human body to that of a long copper wire, we are led to seek out whether, as we have seen with a metallic bobbin, these forms, at the moment of interruption, are extra-current, and whether, as in

the case of the bobbin, we have at the opening a stronger excitement than at the shutting of the current.

In the passage of the current through the organism, none of these phenomena occur, and it is, on the contrary, the closing current and not the opening one which determines the most energetic action, and often indeed the only one which we can demonstrate.

To understand this, we must know that the rupture of the current determines an energetic action only on bodies whose molecules are very mobile, homogeneous, easily vibrating, and especially not endowed of themselves with proper movements. None of these conditions are to be found in the system, and variations of tension and of orientation only occur there very slowly. The quickness of nervous influx is a proof of this, when compared with the quickness of electricity and even of sound. Nevertheless, and this is a logical consequence, it is in tissues which can the most rapidly modify their molecular state that rupture of the current has the greatest action. In this respect, the nervous system, and especially the sensitive nerves and special nerves of the senses, are the most excitable by rupture of a current. Thus, when we electrise a nerve, the optic nerve especially, we must be very careful as to the very intense excitement which takes place at the moment of cessation of the current. In these cases we should never remove the rheophores abruptly. It is the same when we electrise the cervical ganglia or upper part of the spinal cord: syncope or giddiness is produced on the rapid rupture of the current.

There is yet another cause which modifies the production of the extra-current in organic tissues, and that is, the formation of a current of polarisation.

By current of polarisation is meant a current which forms after the cessation of the current properly so called, and which always runs in an inverse direction to the principal current.

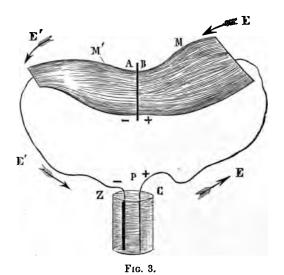
Amongst metals, lead and platina principally enjoy the power of producing currents of polarisation, and a certain number of apparatuses, amongst which I may mention that of Thompson and Planté's pile, are founded on this special property of lead and platina.

It may be said, in a general manner, that every bad conduct-

ing body, which can decompose electrolytically, will give rise to currents of polarisation each time it is crossed by an electric current.

The human body essentially fulfils these conditions, as it is a bad conductor and contains substances which are easily decomposed. So there form in it very intense currents of polarisation, which we had occasion to observe from our very first researches.

Indeed, there exist few substances which, like organic tissues, can give rise so rapidly and so energetically to currents of polarisation. I have often observed it in man, and it is very easy to make it out by the following experiment:—

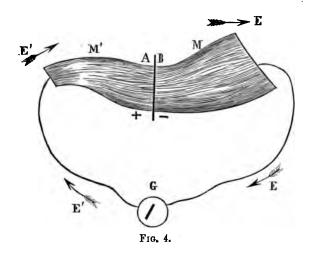


Given a muscle, M M' (Fig. 3), sectional at A B and crossed by an electric current proceeding from the pile P, and running as shown by the arrow in the direction of E M B A M' E'.

As soon as the current is stopped, and as the wires are passed through a galvanometer G (Fig. 4), a deviation of the needle of the galvanometer is obtained, showing that notwithstanding the cessation of the current from the pile, there still exists a current in the circuit, but with an opposite direction, or directed as is shown in the figure, according to E'M' A B M E.

These currents have a pretty long duration. I have seen them persist more than a quarter of an hour in man. Their energy and their duration depend on the intensity of the primary current.

These currents of polarisation can even be much stronger than the primary currents; for, as in Planté's pile, there forms an accumulation of electric force which escapes on the cessation of the primary current and gives rise to more considerable phenomena than those excited by this latter current.



These currents of polarisation, which have been overlooked by the greater number of authors, are of the highest importance in electro-physiological researches. It is obvious that we must consider, in the action of a current on a nerve, not only the current which we cause to act directly, but also the one which is produced in the intimacy of the tissues immediately after the cessation of the external current.

At the moment when the rheophores are removed from the organic tissues, there occurs not only rupture of a current, but also formation of another current, which has an opposite direction and, according to cases, is equal to, or weaker or stronger than, the primary current.

It is chiefly through having overlooked the existence of this current of polarisation that a great many physiologists, and all

and all the German school, have proposed so many theories on the electric state of nerves and alternatives of excitability.

In next number will appear a paper by Dr. Onimus, "On the differences of action of Induced and Constant Currents from a clinical point of view."

[Dr. Anstie's paper "On Anomalies in Typhoid Fever, and their Treatment," is necessarily postponed by the unexpected length of M. Onimus's article. We are the more sorry, because Dr. Anstie's paper is based upon the University College cases (supplied through the kindness of Dr. Reynolds and of his clinical assistant, Mr. Sturge) and on a certain number observed by himself.—Ed. *Pract.*]

Rebiews.

Materia Medica and Therapeutics. Vegetable Kingdom. By CHARLES D. F. PHILLIPS, M.D., F.R.C.S.E. Churchills.

Garrod's Materia Medica, 4th Edition. Edited by Dr. Buchanan Baxter. Longmans, 1874.

Materia Medica. By Dr. Thorowgood, F.R.C.P., Lecturer on Materia Medica at the Middlesex Hospital. 1874.

THE two books standing second and third on our list require but Dr. Garrod's useful and popular manual has been brief notice. so many years before the public, that it would be almost an impertinence to say anything further about it, except to mention that the fourth edition has been rendered considerably more complete by means of the able co-operation of Dr. Buchanan Baxter. We should have rejoiced to see that the new editor had exercised his privileges of revision and addition more freely. Whatever he has added is of great value; but it seems a pity that he did not take greater liberties with the original text of some of the articles. We might point, for instance, to the description of the physiological and therapeutic action of digitalis as being sadly behind the present stage of our knowledge, and indeed actually incorrect in some particulars. Dr. Baxter, who is one of the most learned as well as original therapeutists, might, with great advantage, have re-written this and several other articles. However, the book retains all that Dr. Garrod gave it, and (with Dr. Baxter's additions) is one of the most useful compendia of Materia Medica that has ever been offered to the student.

Dr. Thorowgood's little work is also likely to be very useful to students who can hardly hope for a more serviceable textbook to pilot the student through those difficulties which meet him at the examination table.

The work of Dr. C. Phillips is of a much more ambitious character, and apparently intended to answer quite another purpose. The present volume, dealing merely with vegetable

remedies, is only the first instalment, it appears, of a complete work on Materia Medica and Therapeutics, which, according to the preface, will occupy either two or three volumes. The author has proceeded on a plan of his own. While giving a large preponderance to the physiological and the therapeutic actions of drugs, he has thought proper, nevertheless, to retain the custom of giving a short botanical description of each medicinal plant, and in another paragraph he endeavours to describe as accurately as possible the ingredients which are really "active." In regard to this portion of his task, the author has certainly gone much

in advance of any English author of the present day.

It is the great distinction of this book, however, that an amount of space is given in it to careful discussion of the physiological and the therapeutic actions of drugs greater than has been given in any previous English text-book of Materia Medica. Not that every article in the book is long: on the contrary, a great many drugs are treated briefly enough. But in the first place, those remedies which are indisputably of high importance have long and carefully-considered physiological and therapeutic sections devoted to them: of these we may particularly mention opium, digitalis, aconite, cinchona, conium, curara, and several others. Not less interesting to ourselves is the resuscitation, on the ground of recent physiological researches, of certain articles which had great repute in former times, but had recently been credited with scarcely any active properties. The researches of Binz and Grisar are quoted, as showing that the whole series of drugs, the potency of which had been at least considered doubtful. and by many wiseacres denied, in fact possess an exceedingly well-marked power of depressing reflex irritability. Among these drugs, valerian, camomile, and cumin, are chiefly remarkable for the potency of their respective etherial oils. The author generally confirms, from the practical side, what has been thus worked out by physiology: and we are personally able to confirm his observations as regards one of these substances— Some months ago, Professor Binz obligingly camomile oil. directed our attention to the researches in question, and we have since that time been steadily trying the camomile oil. We can assert that this is a very powerful drug, and in many cases of heightened reflex irritability has proved of great service. In a very unusually severe case of mingled chorea and epilepsy in a middle-aged man, we have recently put camomile to what may be called a crucial test; and although the disease was necessarily incapable of complete cure, the amelioration has been very striking, and has been warmly acknowledged by the unfortunate patient. We have not yet had the opportunity of trying the antidotal power of camomile. or any of the substances mentioned by Grisar, against strychnia,

which that author also asserts: nor does Dr. Phillips appear to have tested them in this.

Another remark which ought to interest our therapeutists is that which the author makes respecting arnica. He points out that the erysipelatoid eruptions, &c., which have discredited arnica as a remedy for bruises, have been caused by lotions made with the alcoholic tincture: and he expresses the opinion that a great blunder has been habitually committed by those who have employed alcoholic solutions of arnica for this purpose. The really active ingredient he considers to be trimethylamine, which has of late been attracting so much attention abroad. Now, alcohol extracts hardly any of this substance, but it is perfectly soluble in water; and on the other hand, the spirit does extract arnicine and an irritant oil, which are not present in the aqueous solution.

We have no space to criticise further a volume which the profession, we believe, will receive as a genuine boon. We hope that the author may have time and energy to complete the whole work pretty soon, and that the experience he has gained in the preparation of his first volume will enable him to make the others still more valuable.

Clinic of the Month.

Treatment of Gluteal Aneurysm.—In his lectures at the College of Surgeons, Mr. Holmes gives as the conclusions to which present experience appears to point-1. That gluteal aneurysms, both traumatic and spontaneous, are very favourably circumstanced for the treatment of either rapid or gradual compression applied to the aorta or common iliac. 2. If this treatment do not succeed by itself, it may be supplemented by coagulating injections or galvano-puncture, performed while the patient is narcotised and the circulation commanded. 3. When such treatment fails, and particularly in aneurysms with imperfect or ruptured sacs, when it is not indicated, the internal iliac must be tied when the surgeon thinks that he cannot find the artery outside the pelvis. But when the artery is accessible, the old operation, or the operation of Anel, should be practised, according to the size and extent of the tumour. 4. The ligature of the internal iliac artery is liable to failure in cases of spontaneous aneurysm from a diseased condition of the coats of the artery, and should always be avoided when other means of treatment are available. (Lancet, July 18.)

Hydrochloral by the Rectum in the Vomiting of Pregnancy.—Dr. Simmons, the chief surgeon to Ken Hospital, Yokohama, Japan, remarks that he does not remember having seen hydrochloral, by the rectum, recommended in the vomiting of pregnancy. Should this application of it, however, not be new, the results of the following observations may still have their value for or against the conclusions already arrived at. Aware of the suddenness with which this symptom sometimes ceases, after all hopes of saving the mother, without emptying the uterus, have failed, and that, too, without being able to attribute it to any of the numerous remedies which usually have been tried, except the last, he has waited for a third case before venturing a decided opinion as to its value. Although he saw these cases only in consultation, especial care was taken to obtain their correct histories. The following is one of his cases:-Patient aged 30; third child. Commenced excessive vomiting during fifth week of pregnancy, which continued, with the usual intermissions, till the tenth week, when we saw her. For several days previous the nausea and vomiting had been almost constant, both day and night. She had become very much emaciated and unable to sit up, even in bed, not having retained any nourishment on the stomach for several days. All the usual remedies had been tried, such as oxalate of cerium, hydrocyanic acid, hypodermic injections of morphine, &c., but with little benefit. He suggested the administration by the rectum. morning and evening, of thirty grains of hydrochloral on mucilage, and this to be increased if there was no improvement, or if the specific effect of the medicine was not too decided. An amelioration of the symptoms was obtained by the first injection, and a still more satisfactory one followed the administration of the second. The second day's use of the remedy arrested the vomiting, except at long intervals, and on the third day both nausea and vomiting ceased entirely. There was no return of the symptom. Some nourishment was taken and retained, even on the second day. From this time the patient rapidly gained strength, and was delivered of a healthy child. Should other opportunities offer for a trial of this plan of treatment, he has decided to commence with larger doses, being convinced that a decided impression, produced by the medicine at first, will require its repetition but two or three times to put an end to the disease, for the time at least. He believes that hydrochloral, administered in this manner, will relieve most cases of nervous or sympathetic vomiting, where there is no inflammation especially. Even in strangulated hernia, on theoretical grounds, it ought to act well, not only in checking the vomiting, but in producing relaxation. He would give it a trial also in cholera. (New York Medical Record, June 1874.)

The Dispersion of Tumours by Puncture.—Dr. Cameron observes that those familiar with the East are aware that, from time immemorial, the native hakims have been accustomed to attempt to bring about the absorption of the enlargements of liver and spleen, so common in hot malarious countries, by the use of puncture with long sharp stilets of considerable thickness, Twining, in his work "On the Diseases of Bengal," mentions the practice. Dr. Cameron states that he has never followed it for the purpose of procuring dispersions of such enlargements, but that he has frequently seen those of the liver disappear rapidly after repeated plunges of an ordinary hydrocele trocar when seeking unsuccessfully for suspected abscess, and he never found in any instance inflammatory or any other bad symptoms produced by such operations, strange as it may appear to those unaccustomed to perform them. What he wishes particularly

to draw attention to is, that other enlargements besides those of the liver and spleen may be made to disappear by puncture. Nothing is more tedious than those chronic glandular swellings which, in strumous subjects, often in hot countries follow upon trifling causes, such as angry musquito bites, riding a rough bucking horse, over-exertion, or a strain in cricketing, and so forth. He states that he has known an officer laid up for many months and ultimately invalided, with a large mass of indurated enlarged glands occupying the whole inguinal region, and resisting all the recognised routine of treatment. Accident showed him that deep puncture of such masses with a common lancet held at right angles to the swelling, and pushed down to its bottom, will often cause absorption to set in and proceed rapidly. The first case in which this occurred to him was one of a mercantile gentleman, disabled by a mass of swollen inguinal glands, almost as hard as a board, and resisting all treatment. This patient's loss of time at office was a very serious matter to him, and, influenced by his despairing impatience, Dr. Cameron plunged a lancet perpendicularly into the mass as far as it would reach. The point came out tinged with matter, and hard pressure brought up a little cheesy, ill-formed pus, but no discharge whatever followed, and absorption set in and proceeded rapidly. This and several other cases which he mentions have led him to think that this mode of puncture might be found to bring about the dispersion of such growths as fibrous tumours of the uterus; and reasoning from the non-supervention of evil symptoms after repeated and deep puncture of the liver with a trocar, he sees no ground for fearing to puncture with a small stilet such a fibrous uterine tumour as is often plainly to be felt through the abdominal parietes, and he thinks puncture through them less likely to be followed by evil consequences than puncture per vaginum, owing to the exclusion of air. (Lancet, Aug. 22, 1874.)

Resuscitation from Chloroform Narcosis.—In a paper read before the Surgical Section at the annual meeting of the British Association just held in Norwich, Dr. Marion Sims gives a most graphic account of a case of uterine disease in which, chloroform having been administered for forty minutes, pulse and breathing ceased, but in which resuscitation was effected by inverting the body at Nélaton's suggestion, and this not once, but on three separate occasions, the signs of life becoming extinct as soon as the patient was raised to the horizontal position. He then proceeds to give the details of a second case, in which, having amputated the cervix uteri, the junior house surgeon, who was administering the chloroform, suddenly cried out, "The patient has stopped breathing; she has no pulse." Dr. Sims

quickly inverted the body, and had it held thus; and then he shook the thorax, agitating the head laterally, so as to add an impetus to the movement of the blood, which, with the body in this vertical position, would naturally gravitate toward the brain; the jaws were held asunder, and the tongue hooked with a tenaculum and pulled forward. In a few minutes the breathing was re-established, and then the pulse returned; and soon the patient was placed again on the table in the lateral semiprone position in which all Dr. Sims's operations on the uterus are performed, and the operation was finished, but without any more of the anæsthetic. Dr. Sims believes that obstetricians may take a lesson from Nélaton's method of resuscitation, by adopting it in cases of threatened death from post-partum hæmorrhage. He is not satisfied with simply placing the head low, but in addition to the means usually adopted, inverts the body, and throw what little blood there is left in it wholly to the brain. Dr. Sims has never seen a death from uterine hæmorrhage, but from recollections of the few alarming cases he has witnessed he now feels sure that recovery might have been hastened if he had known and adopted Nélaton's method of inversion. Whether death from chloroform is due to cerebral anæmia or not, it is at least safe to adopt Nélaton's method in all cases of supposed or threatened danger; but Dr. Sims thinks the safest plan is to relinquish the use of chloroform altogether, except in obstetrics. The frequent cases of death from the use of chloroform in surgical operations that have occurred amongst us, even of late, should warn us to give up this dangerous agent, if we can find another that is as efficient and at the same time free from danger. Ether fulfils the indications to a remarkable degree; but, while it is safe, it is unfortunately unpleasant to the physician and bystanders as well as to the patient. He, says Dr. Sims, who will give us an anæsthetic as pleasant to take as chloroform, and as safe as ether, will confer the greatest boon upon science and humanity. (British Med. Journal, Aug. 22, 1874.)

The Therapeutical Action of Quinine.—M. Sée has been delivering a series of clinical lectures on the therapeutic action of quinine at the Charité, some notes of which may be of interest. He is one of the most advanced scientific therapeutists, and believes that the action of drugs in disease may be predicted and explained by their physiological action in health. It is impossible to give more than a general idea of the views advanced and ably expounded by references to the natural history of the various diseases and the known action of quinine in their different forms, especially with regard to malarial fevers and acute rheumatism. His general conclusions are as follows. In health, quinine has a threefold action: firstly, it diminishes

the frequency and force of the action of the heart; secondly, it lowers the tension in the arterial system; and thirdly, it lowers the temperature or prevents its elevation by exercise, &c. Whilst recognising its action on the amœboid movements of the white blood-corpuscles, as shown by Cohnheim, Binz, and others, he does not regard this of great importance. In an able analysis of the various forms of malarial fever, and the teachings of experience as to the value of quinine in each, he concludes that the drug cannot be regarded as a specific or counter poison, as (1) it does not prevent malarial poisoning when taken as a prophylactic; (2) it does not prevent recurrence after a variable period; and (3) it is useless in some of the fatal forms, especially where fever tends to assume a continued type. over, he points out that in other fevers which present the characters of periodicity and the occurrence of irritational rigor—e.g., urethral fever from catheterism—quinine has an equally beneficial effect. He believes that the effect of quinine in ague is due to its threefold action exerted chiefly during the period of rigor: by its action on the heart, it diminishes its frequency and force; on the peripheral arteries, it lowers their tension and produces dilatation; on the spinal cord and vasamotor centres, acting as a sedative, it tends to diminish their excitability; and lastly, it exerts a direct cooling action on the system generally; the latter, however, being the least important In acute rheumatism, M. Sée considers it by far the most valuable medicine; and states that he always returns to it with benefit after the trial of all other methods of treatment Here, again, he sees in its physiological action the most precise indications for its use, especially in its effect on the spinal cord. In lowering its irritability, and thus diminishing the sensibility to pain, and lessening reflex excitability, and thus reducing critation and the afflux of blood to the inflamed joints—does he consider that its value lies, its action on the vascular system and in lowering temperature being also beneficial. which M. Sée recommends is from ½ to 1½ grammes (or 8 to 24 grains, nearly) in the day, increasing it, however, to 2 or 3 grammes, or even more, if needful. It may be mentioned that this mode of treatment is adopted by a large number of the leading physicians in Paris, either exclusively or with other means; and they all appear to be unanimous in its favour. It is only in the acute stages that M. Sée considers it beneficial, except for the relief of pain; and in this respect it is also useful in gout. (Lancet, Aug. 8, 1874.)

Use of Atropia in Phthisical Sweating.—Dr. Williamson, of the Royal National Hospital for Consumption, Ventnor,

observes that in 1872 Dr. Wilson announced in the *Philadelphia Medical Journal* that he had successfully treated four cases of phthisical sweating with the sulphate of atropia; and last year Dr. Fräntzel, of Berlin, published an account of a more extended series of researches. Since then, however, little or no attention appears to have been paid to the subject. The following is the result of some experiments which have been made with the drug in sixteen cases under the care of Dr. A. H. Hassall at the Royal National Hospital for Consumption, Ventnor.

The sulphate of atropia is best prescribed in pill, with extract of gentian; watery solutions are not to be depended upon, for they soon spoil by keeping. The first dose should in no instance be larger than $\frac{1}{80}$ of a grain, and, guided by the results, the dose may, if necessary, be increased to $\frac{1}{50}$, or even to $\frac{1}{50}$ of a grain; but if this latter quantity be exceeded, well-marked symptoms of poisoning will almost certainly ensue. In each of the sixteen cases in which the remedy was tried, the first dose produced a distinct effect on the perspiration, either wholly arresting it or materially diminishing it. In only one-fourth of the cases, however, was this effect direct and permanent; that is to say, only four patients, after using the pills for a varying number of nights, were able to omit the remedy without the sweating returning. But in these four the effect was lasting, for when seen two months after the cessation, each patient reported that he was still free from the slightest dampness. Of the remaining twelve cases, four found the benefit direct, but temporary; that is to say, they obtained complete relief on those nights on which they took the atropia, but the perspirations returned if the pill was missed. In seven cases, although the eightieth of a grain at first diminished the sweatings, the dose had to be increased to maintain the effect. At last, however, the increasing habituation to the drug which characterised the sweats did not apply to the toxic symptoms, for these became so marked that the remedy had to be abandoned in all seven cases, without its having succeeded in putting a stop to the sweats in a single instance. Only one case remains, and here there appears to have been an unusual sensibility to the action of the drug. The eightieth of a grain distinctly lessened the profuse sweating each time it was tried, but after three or four attempts it had to be discontinued on account of the severe symptoms of poisoning to which it gave rise. It will thus be seen that the remedy controlled the perspiration more or less in the whole of the sixteen cases: that the effect was direct but permanent in four; direct but temporary in four; beneficial and transitory in seven; and that it was inadmissible only in one instance. These results will be all the more striking when it is added that in many of the cases the sweatings had extended over a period of several weeks, and had resisted all the ordinary methods of treatment.

The toxic symptoms most frequently complained of were intense heat and dryness of the throat during the night, and indisposition for bodily or mental effort on the following morn-Vomiting sometimes occurred, but diarrheea was not In one case there was retention of urine for several observed. The pupil was sluggish in action, but distinct dilatation was not common except in those cases where $\frac{1}{50}$ of a grain was administered. The patients often complained of dizziness and inability to read any print but that of large type. It is well known that all efforts to check the night-sweats of phthisis too frequently fail; and although it is not urged that the sulphate of atropia is less uncertain than other remedies, it is believed that it will not be found inferior to them in obstinate cases, in some of which it was of much service after all other remedies had failed. The drug would probably prove of extreme value in combating the perspiration in those diseases (such as acute rheumatism) in which the sweating extends over a comparatively short period, and is not so inveterate as that in phthisis. (Lancet, July 25, 1874.)

[We think it right to remark that Dr. Ringer was the real discoverer of this action of atropia, and that his paper announcing the discovery appeared in the *Practitioner* several years ago.—Ed. *Pract.*]

Extracts from British and Foreign Journals.

Galvano-Cautery for the Mouth of the Womb.—Dr. David Prince, of Jacksonville, Illinois, describes a simple apparatus for linear cautery of the os uteri and for the removal of crescentic sections. It consists of-1. An ordinary smallsized uterine probe, with an orifice drilled near the distal end. 2. A platinum wire fused into the orifice in the probe above, and attached to a leaden ball or shot at the lower end. 3. Forceps with which to grasp the wire at its termination in the shot, and to guide it in straight or curved lines. 4. Double connections for convenience in attaching the electrodes to the forceps and 5. Electrodes which lie in coils ready to be connected with a battery. This method of treatment, he adds, surpasses caustic applications in certainty, speed, and safety; it further surpasses the knife in safety, whilst it is equal in certainty and only a little behind in speed; and both the dread and danger of hæmorrhage are avoided. (St. Louis Medical and Surgical Journal, June 1874.)

Therapeutic action of Amyl Nitrite.—R. Pick, after a short account of the chemical action of amyl nitrite, gives a résumé of the diseases in which it has up to the present time been used. These are hemicrania, angina pectoris, epilepsy, bronchial asthma, trismus, and tetanus, in some of which it has proved of decided advantage, whilst in others it has only been a palliative. Experimentally the author corroborates the usually described statements of its producing dilatation of the vessels. In frogs it causes muscular relaxation, retardation of the respiratory movements and circulation, and ultimately paralysis of the heart. Frogs' hearts exposed to the direct action of the vapour of amyl beat more slowly, the several contractions being at first more energetic. Touching them with a little of the fluid quickly causes arrest of the movements. Inhalation in man causes increased rapidity of the pulse till it is almost double its former number, but no increase in the number of the respiratory acts. The vital capacity of the lungs remains unaltered. Infusoria

exposed to the influence of the vapour in a moist chamber cease to move in 200 seconds. The muscles of frogs similarly exposed lose their excitability. Hence it would appear to be an action exerted decidedly on the muscular tissue, and not on the nervous centres; it also acts relaxingly on the vascular musculature. Pick noticed in experiments on himself and others, that if after breathing the vapour the eyes were fixed upon a point on a bright wall, this appeared to be surrounded by a circle of vellow colour; outside of this again was a bluish violet area, at the border of which were looped or sinuous lines. The size of the yellow spot Pick estimates at 5 cm. with the wall at a distance of 60 cm., and conceives that it is a projection of the area lutea of the eye. Pick was not able to satisfy himself that the vessels of the retina underwent any dilatation. Journal, 1874.)

Ammoniacal Fermentation of Urine.—The urine is sometimes ammoniacal at the moment of emission, and is then always an indication of the presence of some constitutional disorder; and it is dangerous in consequence of the facility with which wounds absorb the deleterious elements contained in ammoniacal urine. The attention of the profession has been drawn to this subject by a work of MM. Gosselin and Albert Robin, presented to the Academy of Sciences, with the title, "Recherches sur l'urine ammoniacale ses dangers et les moyens de les prévenir." The two authors chiefly occupy themselves with the therapeutic question, and have recommended as specially useful the administration of benzoic acid; but in the discussion which was held in the Academy the conditions and causes of ammoniacal decomposition were particularly dwelt upon by the various speakers. M. Gubler distinguishes two kinds or forms of alkalinity—a primitive alkalinity, and a secondary alkalinity, which he terms alkalescence. The urine is primitively alkaline when it is already alkaline on issuing from the glomeruli of Malpighi or from the renal tubuli. This occurs at the beginning of convalescence from disease in certain ill-defined affections, characterised by debility not yielding to tonics, a bluish tint of the mucous membranes, a tendency to bronchial catarrh; and, lastly, in some diseases of the nervous centres. Alkalinity may result from insufficiency of the normal acids of the urine or excess of bases. The former effect is explained by the immediate want of reparation that the organism experiences after great losses of substance: at such times the fixation of elements predominates, and denutrition is temporarily arrested. The second effect may result from various causes: the passage of carbonate of soda alone or accompanied by blood serum through the tissues of the kidney, as in Bright's disease; the admixture of blood or of a plastic exsudate with the urine; the protracted use of alkalies, as of Vichy water; and, lastly, the production of ammonia in excess, as occurs in uræmia or septicæmic affections. Alkalescence, or secondary alkalinity, may result from the decomposition of urine in the bladder itself, though the immediate cause of this is at present unknown. When the phenomena occur in the air before our eyes, it is easy to say that the air incessantly carries organised particles which are capable of playing the part of a ferment, but how can such agents, it may be reasonably asked, gain entrance into the bladder?

Urine becoming ammoniacal in air does no doubt, as M. Gubler observes, contain a special ferment. Ill-kept and imperfectly cleaned urinals are covered with a greyish yellow layer, the catalytic power of which is not inferior to that of the mycoderma aceti of M. Pasteur. Its contact with urine instantly commences the ammoniacal decomposition. Amongst the elementary organisms which with mineral and organic substances form the greyish substance above mentioned, M. Van Tieghem has distinguished a little torula with a diameter of ten to fifteen thousandths of a millimetre, to which he attributes the special

power of establishing this ammoniacal fermentation.

When the urine becomes ammoniacal in the bladder, it is supposed that the torula must have been introduced. But how? By sounds and catheters, is the reply. But sometimes these have not been used; and the question must be asked, how does it happen that the introduction of such instruments does not generally cause the urine to become ammoniacal? In seeking to answer these points, M. Gubler refers to Bouilland's observation, to the effect that spontaneous alkalescence occurs, especially in serious diseases, when the urine is highly charged with urea; or, as M. Gubler puts it, concentration of the solution favours fermentation: and it is further possible that the presence in the liquid of carbonate of ammonia coming from the blood induces the formation of that which exists latent in the urea, as we see a little (right) tartaric acid projected into a mixture of right and left polarising tartaric acid causes the crystallisation of its congener alone. M. Verneuil, again, states that ammoniscal urine examined under the microscope is never healthy, but contains in all instances numerous leucocytes, which perhaps play a certain part in the production of the alkalinity. This rôle M. Gubler seeks to define. Pus globules, he maintains, chiefly consist of young epithelial cells of epithelium prematurely detached from mucous or pyogenic membrane, and capable of living for some hours at the expense of the medium into which they may be transported. Their whole

life is summed up in nutrition, which presupposes the occurrence of molecular changes perfectly capable of producing a definite chemical action. He formulates his views as follows:—1. The neocytes of pus transform urea into carbonate of ammonia just like a special ferment entering from without. 2. The process takes place slowly because the catalytic power of these rudimentary organs is very inferior to that of a specific species, the nutrition of which is more active and which can reproduce itself indefinitely. (La France Médicale, No. 50, June 24, 1874.)

Treatment of the Bite of the Viper.—At a recent meeting of the Academy of Medicine (June 23, 1874) of Paris, M. Le Roy de Méricourt read a paper which gave rise to an animated discussion on the employment of intravenous injections of ammonia in cases of viper-bite. According to Fontana, the employment of ammonia as an alexiterium is due to Mead; and the circumstance of Bernard de Jussieu (1747) having treated successfully a student bitten by a viper whilst herborising with eau de luce (succinated and ammoniated alcohol), badly investigated and badly interpreted, rendered still more popular the employment of volatile alkali. Fontana strongly contested the value of ammonia in his treatise on the poison of the viper. Its reputation, like a crowd of other substances, was, he thought, only due to its innocuity. He showed that the poison, even when given with volatile alkali, preserves all its activity. Some time afterwards, excited by the report that Vallisneri had obtained success by the intravenous injection of ammonia in a case of viper-bite, Fontana made many experiments showing its inutility. The practice was, however, adopted by Denis in 1667; but from that time till 1869, when it was proposed by Professor Halford, it does not appear to have been again practised. M. de Méricourt gave an account of Professor Halford's experiments, and referred to the contradictory observations of M. Oré, published in M. Ladevi-Roche's thesis "On the History of Intravenous Injections," 1870, and of Fayrer in India, and advanced the following propositions as the results of his inquiries:—1. The only efficacious means, and those which should be rendered popular, are those which have for their object the prevention of the absorption of the poison immediately after the bite: these means are—ligature of the member above the point bitten, lotions, especially of some caustic coagulating substance, cauterisation with the aid of a point of red-hot iron, or by deflagrating a little gunpowder over the wound. 2. If these means have been neglected, applied tardily or ineffectively, and there is fear of the development of general symptoms, recourse must be had to hot alcoholic drinks, given methodically, so as to produce as far as possible sweating and the chimination of urine. Favourable results might be expected from the employment of the new sudorific, 3. If the administration of the hot alcoholic drinks into the stomach be prevented by obstinate vomiting, and confidence be still entertained by the practitioner in ammonia, it may be injected subcutaneously, as it is quite harmless and would act with sufficient rapidity. In the discussion which followed. M. Larrey reported two cases that had been treated with success by Dr. Feuvrier of Montenegro, by means of intravenous injections of M. Charles Robin observed that, in considering the results of this plan of treatment, it must be borne in mind that the bite of the viper was very seldom fatal in France: he had only known one fatal case in a child of 7 or 8 years of age, and in the other cases he had seen, usually left them to time and simple remedies. M. Laboulbène stated that he had found viper-bites in certain departments of the South of France much more fatal than M. Robin had stated, and he was accustomed to administer large doses of alcohol. (La France Médicale, June 27, 1874.)

Apoplexy.—Professor Roth, in an address to the Medical Society of Basle upon apoplexy, first defines the particular form he is about to discuss, by excluding apoplexy resulting from rupture of the vessels of the membranes of the brain, from wounds, from inflammation, the development of tumours, embolism and thrombosis, or of dyscratic origin, as in typhus abdominalis and pyæmia, and confines himself to the consideration of spontaneous apoplexy occurring chiefly in advanced age and suddenly—a form which is usually characterised by the large size of the hæmorrhagic effusion, though it may occasionally be very small and punctiform. As regards its origin, it was, until recently, believed to proceed from the atheromatous degeneration of the vessels, which is often observable in the large arteries of old people. The researches of Hasse, Kölliker, Paget, Wedl, and others have shown that even the minute vessels of the brain are frequently subject to fatty degeneration, and it was supposed that under some unusual strain many of these vessels gave way simultaneously, and by the confluence of many small effusions the great extravasation was formed. Some doubt was, however, thrown upon this explanation by the recent (1868) careful researches of Charcot and Bouchard, who, founding their statements on the examination of more than seventy cases, demonstrated that spontaneous apoplexy depended upon the giving way of small true aneurysms, the presence of which can always be demonstrated in the coagulum. This view, generally accepted and frequently corroborated by French authors, has, it appears, received little attention at the hands of German observers; but M. Roth has carefully examined all the material at his disposal,

and has seen such aneurysms in eight cases. The reason they have been so long overlooked is their minute size, affecting arteries of not more than $\frac{1}{50}$ of an inch in diameter. Hence the name applied to them by Charcot and Bouchard of miliary aneurysms. They are most easily seen near the surface of the brain, and when the pia mater is carelessly removed they come away, leaving little pits. Hasse and Kölliker thought they were indications of acute inflammation of the brain, whilst Schröder v. d. Kolk considered them to be the essential cause of epilepsy, but these views have been overthrown by Virchow.

In the early stages of these aneurysms all the coats of the vessels participate in their formation, whilst subsequently the T. media disappears, and only the internal and external tunics can be demonstrated. They occur sometimes in the course of an artery, sometimes close to its origin, or shortly before its division, and they present various forms, as lateral saccular dilatations, or diverticula, or fusiform, spheroidal, or pyriform enlargements of the vessels; sometimes succeeding to one another rapidly, they give the vessel a moniliform aspect. Their number varies exceedingly, in some cases being limited to six or seven, and in others being quite innumerable, and forming groups. They are most frequent in the corpus striatum (including the nucleus lentiformis) and thalamus opticus. After these sites they are most common in the cortex cerebri, including the pia mater; and lastly, they are found in the pons, medulla oblongata, and grey substance of the cerebellum; they are rare in the white substance of the cerebellum and cerebrum.

In regard to the results of their presence, they may in the first instance terminate in spontaneous recovery, owing to increasing thickening of the tunica intima, perhaps with deposit of fibrin. Usually, however, after attaining a certain size they rupture, and extravasation of blood takes place. Partial rupture analogous to the aneurysma dissectans may occur, the blood being effused beneath the adventitia. The remains of old hæmorrhages betray themselves by pigment, which is partly crystalline and partly amorphous. When favourable results occur, the hæmorrhages have usually taken place upon the convexity of the hemispheres.

Those hæmorrhages are of much greater importance which, attaining the size of a hazel nut or even of a hen's egg, occur in the corpus striatum and thalamus opticus. The larger size of these hæmorrhages is due to the larger diameter of the blood-vessels in these parts, and their more direct origin from the carotid. With a little care one or more arteries with aneurysmal dilatation upon them may almost always be found, but the exact spot of rupture is often difficult to discover. In regard to the development of aneurysm of the cerebral vessels three possibilities

present themselves. 1. Changes in the pressure of the contents of the vessel. 2. Diminished resistance of the adjoining parts of the brain. 3. Alteration in and diminished resistance of the vascular wall itself. The change in the pressure is often caused by hypertrophy of the left ventricle, which is a common though by no means constant condition. In eight cases, five had hypertrophy, two atrophy, and one dilatation of the left ventricle. Professor Roth does not believe there is any close relation between apoplexy and alterations in the consistence of the brain. considers the essential condition to be alterations in the structure of the vessels. The nature of the changes, however, has been much discussed, and he gives the various views that have been entertained—that of Virchow, for example, to the effect that in the small aneurysms of the pia mater all these coats are dilated; that of Charcot and Bouchard, that a periarteritis (cell-growth and thickening of the adventitia) is the starting-point; and that of Zenker, that the miliary aneurysm of the smaller cerebral arteries results from atheromatous degeneration of the tunica intima. His own researches lead him to think that the primary and constant pathological change is in the muscularis, though many other conditions lead up to or favour the process. There is in the first instance general dilatation of the arterial walls (hypertrophy with dilatation); this condition is often associated with atheromatous disease of the intima. The media then atrophies with amyloid degeneration of the circular muscular fibre layers. Then follows, finally, the thickening of the intima and adventitia which Charcot, Bouchard, and Zenker regard as the first stage. (Correspondenz Blatt, No. 6, 1874.)

Department of Public Bealth.

THE INTERNATIONAL SANITARY CONFERENCE.

In the last number of the *Practitioner* we gave a brief account of the constitution of the International Sanitary Conference, and of its preliminary discussions. The Conference terminated its work on the 1st August, after twenty sittings, and we are now enabled to present our readers with a summary of its conclusions. This we propose to do in the order in which they were arrived at as set forth in the official proceedings of the Conference, indicating the conclusions which were unanimously adopted by the capital letter U, and stating the distribution of the votes where unanimity was not arrived at.

A.—Scientific Questions.

- I. Origin and genesis of Cholera; endemicity and epidemicity of this disease in India.—Asiatic cholera, susceptible of spreading (epidemically), is spontaneously developed in India, and when it breaks out in other countries, it has always been introduced from without. (U.) It is not endemic in any other country but India. (U.)
- II. Questions of Transmissibility.—1. Transmissibility by Man.—Cholera is transmissible by man coming from an infected medium; but man is not considered as the specific cause,
- ¹ The following delegates, who took their scats in the Conference after it had commenced its sittings, or whose names had not been announced when our last article was penned, must be added to the list given in the *Practitioner* for August:—Dr. Proust (*France*); Dr. Larsen (*Norway*); Dr. Kleen (*Sweden*); Dr. Bartoletti and Aali Bey (*Turkey*); Dr. Mendez-Alvaro, Dr. Bartolomé Gomez de Bustamente, and Dr. Montejo Robledo (*Spain*).

apart from the influence of locality; he is regarded as the propagator of cholera when he comes from a place where the germ of the disease already exists. (U.)

- 2. Transmissibility by Personal Effects (clothing, linen, bedding, &c.)—Cholera can be transmitted by personal effects coming from an infected place, especially such as have served for the sick from cholera; and certain facts show that the disease can be carried to a distance by these effects if shut up so as to prevent free contact with the air. (U.)
- 3. Transmissibility by Foods and Drinks.—(a) Foods.—The Conference not having conclusive proofs of the transmission of cholera by foods, decided by eleven States against seven that it was not justified in coming to a decision on this question.
- (b) Drinks.—Cholera can be propagated by drinks, particularly by water.
- 4. Transmissibility by Animals.—No proof exists of the transmissibility of cholera by animals, but it is reasonable to admit the possibility of such transmission. (Yes, 10; No, 2; abstaining, 6.)
- 5. Transmissibility by Merchandise.—Although proof is wanting of the transmission of cholera by merchandise, the possibility of such transmission in certain conditions should be admitted. (Yes, 13; abstaining, 5.)
- 6. Transmissibility by Cholera-corpses.—Although it is not proved that cholera-corpses can transmit cholera, it is prudent to consider them dangerous. (U.)
- 7. Transmissibility by the Atmosphere alone.—No fact is yet known which proves that cholera can be propagated to a distance by the atmosphere alone, whatever its condition. Moreover, it is a law, without exception, that an epidemic of cholera is not propagated from one place to another in a shorter space of time than it takes man to travel.

The surrounding air is the principal vehicle of the generative agent of cholera; but the transmission of the malady by the atmosphere, in the immense majority of cases, is restricted to the close vicinity of the focus of emission. As to facts asserted of transportation to a distance of one or many miles, they are not conclusive. (U)

8. Action of the Air upon the Transmissibility.—It results from

a study of the facts that in free sir the generative principle of chosen amaly oses its morbide activity; but that in certain conditions of confinement this serious may be preserved during an indetermined time. Freat lesserts form a very efficacious barrier spainst the propagation of cholera. This disease has never been imported into Egypt or Syria, across the desert, by caravans from Mecca.

Direction of Incidental.—In almost every case the period of menhation—that is to say, the time which elapses from the moment when an individual has contracted the choleraic intoxication to the commencement of the premonitory diarrhoes or of confirmed choices—foes not exceed a few days. All the facts sized of a more prolonged period of incubation refer to cases which either are not conclusive, or in which the premonitory diarrhoes has been included in the period of incubation, or in which contamination the contraction of the choleraic intextention, has occurred after departure from the infected place.

Observation shows that the duration of the choleraic diarrhoea called premenitory—which must not be confounded with other kinds of diarrhoea that may exist where cholera prevails—does not exceed a few days.

The facts instanced as exceptional do not prove that cases of diarrhoza of lengthened duration belong to cholera and are susceptible of transmitting the malady, when the person affected is removed from all cause of (choleraic) contamination. (Yes, 13; No, 1; abstaining, 4.)

IV. Questions as to Disinfection.—Are any means or processes of disinfection known by which the generative or contagious principle of cholera can be certainly destroyed or deprived of its intensity? (No, 12; abstaining, 7.)

Are any means or processes of disinfection known by which the generative or contagious principle of cholera can with some chance of success be destroyed or deprived of its intensity? (Yes, 13; No, 5.)

Science does not yet know any certain and specific measures of disinfection; but the great value of hygienic measures, such as ventilation, thorough cleansing, &c., is to be recognised, combined with the use of the substances regarded as disinfectants. (U.)

B.—QUESTIONS AS TO QUARANTINE.

- I. Land Quarantine.—Holding that land quarantines are impracticable and useless, on account of the numerous and daily increasing means of communication; holding, also, that they compromise seriously commercial interests, the Conference rejects them. (Yes, 13—Germany, Austria, Hungary, Belgium, Denmark, Great Britain, Italy, Norway, Netherlands, Persia, Roumania, Russia, Sweden; No, 4—France, Greece, Portugal, Servia; abstaining, 2—Luxembourg, Switzerland.)
- II. Maritime Quarantines.—1. Measures to be taken out of Europe.—With the object of preventing further invasions of cholera in Europe, the Conference approves the measures recommended by the Constantinople Conference (1866), particularly the measures of quarantine suggested in the Red Sea and the Caspian Sea. The organisation of these measures should be of the most complete description, and such as to satisfy the most rigorous principles of hygiene.
- 2. Measures to be taken in European Ports.—When cholera has invaded Europe, the Conference recommends the subjoined system of medical inspection; but in the case of States which prefer to maintain quarantine, it submits the principles upon which it should be regulated:—

(a.) System of Medical Inspection.

- (1.) There should be established in each port open to commerce a sanitary authority formed of physicians and local representatives, aided by a proper staff. The number of members in each of these different categories will vary according to the importance of the port; but the number should be sufficient to permit of the measures exacted with regard to ships, crews, and passengers being carried out rapidly under all circumstances. The principal officer of the sanitary authority will always be kept informed through official sources of the sanitary state of all ports infected with cholera.
- (2.) Ships arriving from clean (healthy) ports, and which, according to the oath of the captain, have not touched in the course of their voyage at an intermediate suspected port, or communicated directly with a suspected ship, and in which,

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during the voyage, no actual or suspected case of cholera has occurred, will be admitted to free pratique.

- (3.) Ships arriving from a suspected or infected port, and those coming from unsuspected ports, but which, during the voyage, have had intermediate compromising relations, or on which suspected cases of, or deaths from, cholera may have occurred, will be submitted, on arrival, to a rigorous medical examination, in order to determine the sanitary state of the crew and passengers.
- (4.) If it results from the medical examination that no case of sickness or the corpse of any person dead from cholera exists on board, the ship, with all it contains, will be admitted to free pratique; unless cases of cholera, or of a suspicious nature, have occurred during the voyage, when the ship, the clothing, and the luggage of the crew and passengers will be submitted first to a thorough disinfection, although both crew and passengers be then free from cholera.
- (5.) If any suspected case of cholera, or death from cholera, be found on board, the sick will be at once removed to a lazaret or to an isolated place provided for the purpose, and the dead will be cast into the sea with customary precautions, or will be buried after fitting disinfection; the passengers and crew will be thoroughly disinfected, and the ship itself will also be disinfected after the removal of the passengers and such portions of the crew as may not be necessary for the disinfection and charge of the vessel. The clothing and luggage of the sick, and also of the healthy passengers, will be subjected, in special premises and under rigorous control of the sanitary authority, to a thorough disinfection. After this disinfection the property of the passengers and crew will be restored to them, and they will be admitted to free pratique.
- (6.) The merchandise landed will be admitted to free pratique with the exception of rags and other susceptible objects, which will be submitted to thorough disinfection.
 - (b.) System of Quarantines.—Arrivals from Infected Ports.
- (1.) Arrivals from infected ports should be submitted to from one to seven full days' observation, according to circumstances.
 - (2.) Suspected Ships.—If the sanitary authority is satisfied

that no case of cholera or of a suspicious nature has occurred on board during the voyage, the duration of observation should be from three to seven days, dating from the time of the medical inspection. If, however, the voyage has lasted at least seven days, the time of observation may be reduced to 24 hours, for the examination and disinfection which may be judged necessary. In cases of this category the quarantine of observation may be completed on board if no case of cholera or any suspicious sickness has occurred, and the hygienic condition of the ship be good. In such cases unlading of the ship is not necessary.

- (3.) Infected Ships.—If any case of cholera or of suspicious sickness has occurred during the voyage, or after the arrival, the duration of observation for the healthy should be seven full days, dating from their isolation in a lazaret or other place provided for them. The sick should be landed and subjected to proper treatment in an isolated locality set apart for them, and separated also from the place where the healthy undergo observation. The ship, and all objects in it susceptible of retaining infection are to be submitted to a thorough disinfection, after which the persons remaining on board the ship will be subjected to seven days' observation.
- (4) Arrivals from Suspected Ports.—Arrivals from suspected ports—that is to say, from ports adjoining and having free communication with a port where cholera exists—should be submitted to observation not exceeding five days in duration, if no suspicious sickness has happened on board.
- (5.) Various Regulations.—Ships carrying emigrants and pilgrims, and generally all ships considered peculiarly dangerous to the public health, may, under the conditions previously noted, be subjected to special precautions, to be determined by the sanitary authority of the port of arrival.
- (6.) When the local resources do not permit of the measures herein prescribed being carried out, the infected ship should be sent to the nearest lazaret, after having received such aid as she may need.
- (7.) A ship arriving from an infected port, which has put into an intermediate port, and received there free pratique without having performed quarantize, is to be considered and treated as arriving from an infected port.

- (8.) In cases of simple suspicion, measures of disinfection are not strictly requisite, but they may be carried out if the sanitary authority thinks fit.
- (9.) A port in which cholera prevails epidemically should not carry out quarantine properly so called, but should solely have recourse to measures of disinfection.

(c.) Regulations common to the Two Systems.—Medical Inspection and Quarantines.

- (1.) The captain, the medical officer, and the officers generally should be required to declare to the sanitary authority all that they know with regard to suspicious sickness among the crew and passengers, subject to penalty in the event of a false declaration or of deliberate concealment. It is to be desired that an international agreement should be come to on this subject.
- (2.) The disinfection either of luggage or of ships will be effected in such manner as the competent authorities of each country may determine.

(Yes, 21; abstaining, 1—Spain.)

The Conference expressed a wish that a penal law applicable to sanitary contraventions should be enforced in the Ottoman Empire, by 15 affirmative votes to 4 negative, 3 States abstaining.

III. River Quarantines.—All the arguments advanced to prove that land quarantines are impracticable and useless in preventing the propagation of cholera, apply equally to river quarantines.

The measures recommended in the system of medical inspection by the Conference can be adopted for ships in rivers, having cholera on board.

Ports at the mouths of rivers come within the category of maritime ports, and the measures recommended for these ports consequently apply to them. (Yes, 19; abstaining, 3—Servis Turkey, Egypt.)

- C.—PROJECT FOR THE FORMATION OF A PERMANENT INTER-NATIONAL COMMISSION ON EPIDEMICS.
- I. Object: Utility.—A permanent International Sanitary Commission should be established at Vienna, for the study of epidemic diseases.

II. Functions.—The functions of this Commission would be purely scientific, and, as regards scientific questions, consultative. The Commission would have for its principal object the study of cholera in regard to its etiology and prophylaxis. It would nevertheless include in its studies other epidemic maladies. To this end it would prepare a programme comprising the researches which ought to be undertaken in a uniform manner by the contracting States, upon the etiology and prophylaxis of cholera and other epidemic maladies. It would publish the result of its labours. Finally, it would propose the convocation of International Sanitary Conferences, and would have the duty of preparing the programme of those Conferences.

III. Constitution and Operation.—The Commission should be composed of medical men, delegates of the Governments taking part in it. At the seat of the Commission there should be a fixed office, with staff, to centralise the work and aid the deliberations of the General Commission. The nomination and the composition of this staff should be left to the General Commission. The Governments taking part would give to their sanitary authorities and their councils of public health, instructions to furnish to the International Commission all information relating to the questions coming within the range of its studies. In those countries where International Sanitary Councils are established, these will furnish the information they possess, and will prescribe necessary researches.

IV. Ways and Means.—The necessary costs for the working of the International Commission will be divided among the different States interested, and will be regulated diplomatically.

V. Posts and Missions.—In countries where there is no organised sanitary service, researches should be made, the Government of the country assenting, either by temporary missions or by medical men regularly stationed there. These missions and regular sanitary posts, instituted internationally, should be created according to suggestions of the International Commission, receiving their instructions from it, and reporting to it.

Additional Article.— It is to be desired that an International Council of Health, analogous to those which work with so much advantage at Constantinopia and Alexandria, should be instituted in Persia.

Such a Council would contribute much by the authority of its advice, given when needed, to ameliorate the sanitary condition of the country, and would at the same time be a powerful means of protection against the invasion of Europe by epidemics.

Appendix to Sec. II. of this Project.

As preliminary researches, the Commission might occupy itself with the following questions:—

- 1. The regular and consecutive study of the rainfall and evaporation during the year in the following stations:—Bender-Bushire, Ispahan, Teheran, Tabriz, Suez, Alexandria, Astrakhan, Baku, Tiflis.
- 2. The scientific study of the telluric condition of these separate towns.
- 3. The exactest examination, undertaken in a more analytical spirit than has yet been shown, of the appearance and propagation of cholera upon ships. These researches should be undertaken provisionally upon several much-frequented lines, viz.: Calcutta—Mauritius; Alexandria—Malta; Alexandria—Marseilles; Southampton—North America; Hamburg—New York; Singapore—Aden—Jeddah; Calcutta—Aden—Jeddah; Bombay—Aden—Jeddah; Naples—Venice.
- 4. To determine the first cases of each epidemic of cholera which appears in the different localities, and especially in the maritime ports of Europe, and collect the elements of a complete statistical account of the progress of cholera in Europe.
- 5. To determine by scientific facts the precise duration of the incubation of cholera.

This project was adopted unanimously, but the delegates of Great Britain appear to have been absent from the sitting in which it was discussed.

D.—YELLOW FEVER.

The Conference received many communications on yellow fever, but it decided, unanimously, that this subject should be referred to the permanent International Commission on Epidemics of which it had proposed the formation.

SANITARY LEGISLATION DURING THE PAST SESSION.

THE past Session of Parliament has been somewhat prolific of sanitary legislation. Of Sanitary Acts properly so called, the following have received the Queen's assent, and have now been published, namely:—the Sanitary Laws Amendment Act; the Registration of Births and Deaths Act; the Public Health (Ireland) Act; the Vaccination Act (1871) Amendment Act; the Alkali Act (1863) Amendment Act; and the Slaughterhouses, &c., Act. Each of these Acts we propose to note briefly.

The Sanitary Laws Amendment Act (37 and 38 Vict. cap. 89) consists of fifty-nine clauses. The first eighteen of these refer to explanations and amendments of the Public Health Act 1872, clearing up certain difficulties and ambiguities as to expenses of sanitary authorities, transfer of powers, provisional orders, compensation of officers deprived of office by that Act, &c. In other clauses it is declared (sec. 1) that the rural sanitary authority and board of guardians are the same authority; and provision is made for riparian authorities being represented on port sanitary boards, in cases where a port sanitary authority has a jurisdiction which includes the district of more than one riparian authority; also for the combination of the sanitary authorities of several ports into one body, to form a port sanitary authority for a district (sec. 14).

Sections 19-21 relate to amendments of other Sanitary Acts, and the powers and duties of sanitary authorities. These include provisions for the expenses of the chief officer of police, who may be called upon to institute proceedings under the 16th section of the Sanitary Act 1866; for enforcing by mandamus any order made by the Local Government Board, under the 49th section of the Sanitary Act 1866, against a defaulting sanitary authority; and for imposing, under penalty, upon urban sanitary authorities the duty of cleansing streets, privies, and ashpits. This important pravision is as follows:—

"Sec. 21.—Every urban sanitary authority, and every rural sanitary authority who shall have been invested with the requisite powers, shall, when the Local

Government Board by order so direct, make due provision for the proper cleansing of streets, the removal of house refuse from premises, and the cleansing of earth-closets, privies, ashpits, and cesspools within its district.

"If any sanitary authority having made such provision fail, without reasonable excuse, after notice in writing from the occupier of any house situated in such district requiring such authority to remove any house refuse, or to cleanse any earth-closet, privy, cesspool, or ashpit belonging to such house or used by the inmates or occupiers thereof, to cause the same to be removed or cleansed, as the case may be, within seven days, the sanitary authority shall on summary conviction be liable to pay to the occupier of such house a penalty not exceeding five shillings for every day during which such default continues after the expiration of the said period."

Sections 22-30 relate to matters concerning the constitution and election of Local Boards; and sections 31-35 to certain provisions as to the acquisition of property. Among these provisions is one (sec. 33) which authorises a sanitary authority, subject to the provisions of this Act and of the Sanitary Acts, to buy up any water-mill, dam, or weir which interferes with the proper drainage of, or the supply of water to, its district; also, for the purpose of supplying its district with water for drinking and domestic purposes, the sanitary authority may purchase, either within or without its district, any land covered with water, or any water, or right to take or convey water.

Sections 36-40 relate to certain amendments of the borrowing powers of sanitary authorities, and to the audit of accounts; and sections 41-49 deal with by-laws.

The different sections as to by-laws are of considerable importance. By section 41, no work for which a notice, plan, or description is required by any by-law legally made and confirmed shall be commenced before the expiration of one month from the day on which the said notice, plan, or description shall have been delivered to the authority, nor at all if the said authority give notice of disapproval within one month of the day of such delivery, unless the person proposing to execute the work can show the same is in every respect conformable to every such by-law, as well as to the general law applicable to it. Section 42 provides for the recovery, by summary proceeding, of costs incurred by the sanitary authority in removing works executed contrary to any by-law; and section 43 makes provision for continuing breaches of by-laws. Section 44 extends the power of making by-laws, in regard to the walls of buildings, to the

roofs, foundations, and spouts on the outside thereof, and for the purposes of health as well as for the purposes of stability and protection against fire. Section 45 empowers a sanitary authority to make by-laws, to be confirmed by the Local Government Board, for regulating the lodging and other treatment of persons engaged in hop-picking in the district of such authority. In section 46, provision is made that by-laws for the prevention of nuisances, made by corporations, shall be submitted to the Local Government Board; and that regulations made under the 9th section of the Common Lodging House Act 1851 shall be confirmed by that board instead of by the Home Secretary. Section 47 enables the Local Government Board to declare the enactment as to houses let in lodgings, contained in the 35th section of the Sanitary Act 1866, in force in any part of the metropolis and in the district of any sanitary authority. Section 48 provides for the due notice, inspection, and publication of any by-laws proposed to be made by rural sanitary authorities under the Sanitary Acts; and section 49 provides for notices of common lodging-houses and slaughter-houses to be affixed on the premises.

The remainder of the sections of the Act (50-59) relate to miscellaneous sanitary provisions and the interpretation of words. The first of the miscellaneous sanitary provisions (sec. 50) refers to polluted water in wells and pumps, and is as follows:—

"If it shall be represented to any nuisance authority in the metropolis, or to any sanitary authority, that within their district the water in any well, tank, or cistern, public or private, or supplied from any public pump, and used or likely to be used for domestic purposes, is so polluted as to be injurious to health, such authority may apply to any justices having jurisdiction within their district, in petty sessions assembled, for an order to remedy the same, and thereupon such justices shall summon the person occupying the premises to which the well, tank, or cistern belongs, if it be private, and as regards any public well, tank, or cistern, or pump, such other person as shall be alleged in the application to be interested in the same, and shall either dismiss the application or make such an order in the case, by directing the well, tank, or cistern, or pump to be permanently or temporarily closed, or the water to be used for certain purposes only, or providing otherwise, as shall appear to them to be requisite to prevent injury to the health of persons drinking the water.

"For the purposes of such inquiry, the said justices may cause the water to be analysed at the cost of the sanitary authority applying.

"And all the expenses incurred by such authority in and about the procuring of this order, and in carrying it into execution, shall be charged upon the funds applicable to their general expenditure, but in the case of a rural sanitary

authority, shall be deemed to be special expenses within the meaning of the Sanitary Acts.

"Provided that where the order is made in respect of any private well, tank, or cistern, any person aggrieved thereby may appeal against the same in the manner provided by the one hundred and thirty-fifth section of the Public Health Act 1848, and with the same incidents and consequences.

"Where the justices dismiss the application, they may, if they think fit, award such costs to the person summoned as to them shall appear to be reasonable."

Section 51 makes provision that for the purposes of the 26th section of the Sanitary Act 1866, every hospital or place for the reception of the sick which shall be declared by an order of the Local Government Board to be situated within a convenient distance of the district of any authority, for the purposes of that section, shall be deemed to be within the district of such authority. The same section also provides that when a justice shall make an order under that section for the removal of a sick person to a hospital or other place, he shall address it to such police or other officer as he shall consider expedient; and every person wilfully disobeying the order, or obstructing the execution of the same, shall be guilty of an offence punishable on summary conviction before two justices, and be liable to a penalty not exceeding ten pounds.

Section 52 extends the provisions of sections 51 and 52 of the Public Health Act 1872, relating to the destruction of infectious bedding, clothing, &c., and giving compensation to the same, to the nuisance removal authorities in the metropolis and city of London.

Section 53 extends the right of complaint as to nuisances under the Nuisances Removal Acts to nuisances in any parish or place, whether on private or public premises, and enables this right to be exercised by any inhabitant in such parish or place, or by any owner of premises situated therein, or by any other person aggrieved or injuriously affected thereby.

Section 54 provides that section 2 of the Nuisances Removal Act for England (Amendment) Act 1863, which relates to the seizure of diseased and unwholesome meat and other foods, shall extend to milk also; and section 55 empowers a justice to grant, on complaint on oath of a medical officer of health or other officer of a sanitary authority, a warrant to search for unsound food.

Section 56 relates to false representations with respect to infectious disease by persons letting for hire any house or part of a house, and is as follows:—

"If any owner or occupier, or person employed to let for hire, or to show for the purposes of letting for hire, any house or part of a house, when questioned by any person negotiating for the hire of such house or part of a house as to the fact of there being in such house, or having within six weeks previously been therein, any person suffering from an infectious, contagious, or epidemic disease, knowingly makes a false answer to such question, the person so answering falsely shall be guilty of an offence punishable on summary conviction, and, at the discretion of the justices having cognisance of the case, be liable to be imprisoned, with or without hard labour, for a period not exceeding one month, or to pay a penalty not exceeding twenty pounds."

It will be observed that the provision of the original bill in this section, as to freedom of the house for three months from infectious disease, has been modified in the Act to the more reasonable period of six weeks.

The Registration of Births and Deaths Act (37 and 38 Vict. cap. 88) consists of fifty-four sections. Of these sections, 1-8 relate to the mode of registration of births, and provide that the registration shall be compulsory, and that information concerning a birth is to be given to the registrar within forty-two days. In default of such information the registrar is required, after an interval of forty-two days, to demand it. In the event of the finding a newborn child, the person finding it or having it in charge is required to give information to the registrar. It is the duty of a registrar to inform himself carefully of every birth in his district, and upon receiving information of a birth within three months of its occurrence to register the same without fee, unless he is called upon to register the birth away from his office, when he is entitled to a fee of one shilling. Provision is made for registration after the expiration of three menths from birth; for the registry of birth out of the subdistrict in case of removal; for the saving of the father of an illegitimate child; and for the registration of the name of a child, or of alteration of name.

Sections 9-16 relate to the mode of registration of deaths. The Act provides that the registration of deaths as well as of births shall also be compulsory, and imposes upon the nearest relatives of the deceased present at the death, or in attendance

during the last illness of the deceased, and in default of such relatives, of every other relative of the deceased dwelling or being in the same sub-district as the deceased, and in default of such relatives, of each person present at the death, and of the occupier of the house in which, to his knowledge, the death took place, and in default of the persons before mentioned, of each inmate of such house, and of the person causing the body of the deceased person to be buried, the duty of giving, to the best of their knowledge and belief, to the registrar, within the five days next following the day of such death, information of the particulars required to be registered concerning such death, and in the presence of the registrar to sign the register. Provision is also made for information concerning death where the deceased does not die in a house, and for the extension of the period of registration to fourteen days on certain preliminary information being given to the registrar; also for registration in default of information given to the registrar. Further, the registrar is required to register without fee, unless called upon to register at the house where the deceased died. Other provisions relate to registration of death after the expiry of twelve months, and upon information by the coroner.

Sections 17-19 relate to burials, and include a provision for the prevention of deceased children being buried as still-born, a penalty not exceeding ten pounds being attached to the contravention of this provision.

Section 20 relates to certificates of cause of death, and concerns the medical profession very nearly. It is as follows:—

- "With respect to certificates of the cause of death, the following provisions shall have effect:—
 - (1.) The Registrar-General shall from time to time furnish to every registrar printed forms of certificates of cause of death by registered medical practitioners, and every registrar shall furnish such forms gratis to any registered medical practitioner residing or practising in such registrar's sub-district.
 - (2.) In case of the death of any person who has been attended during his last illness by a registered medical practitioner, that practitioner shall sign and give to some person required by this Act to give information concerning the death, a certificate stating to the best of his knowledge and belief the cause of death, and such person shall, upon giving information concerning the death, or giving notice of the death, deliver that certificate to the registrar, and the cause of death

as stated in that certificate shall be entered in the register, together with the name of the certifying medical practitioner.

(3.) Where an inquest is held on the body of any deceased person, a medical certificate of the cause of death need not be given to the registrar, but the certificate of the finding of the jury furnished by the coroner shall be sufficient.

If any person to whom a medical certificate is given by a registered medical practitioner in pursuance of this section fails to deliver that certificate to the registrar, he shall be liable to a penalty not exceeding forty shillings."

Under section 39 of the Act, it is provided that every person who refuses or fails, without reasonable excuse, to give or send any certificate in accordance with the provisions of the Births and Deaths Registration Acts 1836 and 1874, shall be liable to a penalty not exceeding forty shillings for each offence.

Sections 21-35 concern superintendent registrars and registrars; section 36 deals with the correction of errors in registration; and section 37 provides for the registration of births and deaths at sea. The remaining sections refer to certain miscellaneous provisions, and to the repeal of provisions in previous Acts.

The Vaccination Act 1874 (37 and 38 Vict. cap. 75) consists of two sections only and the preamble. It was passed to remove certain legal doubts whether the Local Government Board was empowered, under section 5 of the Vaccination Act 1871, to make rules, orders, and regulations with respect to the proceedings to be taken by the guardians or their officers for the enforcement of the provisions of the Vaccination Acts 1867 and 1871. The present Act removes the doubt by reciting that the power of making such rules and so forth is included in the section referred to.

The Alkali Act (1863) Amendment Act (37 and 38 Vict. cap. 43) consists of ten sections. It provides that the formation of any sulphate in the treatment of copper ores by common salt or other chlorides, concerning which doubts have been entertained as to the operation of the Alkali Act, shall be deemed to be a manufacture of sulphate of soda within the meaning of the Act. It further provides that every alkali work shall be carried on in such manner as to secure the condensation to the satisfaction of the inspector, derived from his own examination

or from that of a sub-inspector, of the muriatic gas evolved in such work to such an extent that in each cubic foot of air, smoke, or chimney gases, escaping from the works into the atmosphere, there is not contained more than one-fifth part of a grain of muriatic acid. In addition to the condensation of muriatic acid gas as aforesaid, the owner of every alkali work is required to use the best practicable means of preventing the discharge into the atmosphere of all other noxious gases arising from such works, or of rendering such gases harmless when discharged. The Act sets forth the penalties for contravention of its provisions, and empowers the inspectors to enter works for the purposes of the Act. It further defines the noxious gases coming within the provisions of the Act, other than muriatic acid gas, to be sulphuric acid, sulphurous acid, except that arising from the combustion of coals; nitric acid, or other nitrous oxides of nitrogen, sulphuretted hydrogen, and chlorine.

The Slaughter-houses (Metropolis) Act 1874 (37 and 38 Vict. cap. 67) has for its title, "An Act to regulate and otherwise deal with slaughter-houses and certain other businesses in the metropolis." It consists of seventeen sections, the majority of which are of unusual magnitude, the whole occupying near upon eight folio pages. The Act absolutely prohibits the establishing anew, within the limits of the metropolis, any of the following businesses, namely: blood-boiler, bone-boiler, manure manufacturer, soap-boiler, tallow-melter, or knacker; and it forbids the establishment anew of the following other businesses, except with the sanction of the local authority, namely: fellmonger, tripe-boiler, slaughterer of cattle, or any other business which the local authority may declare by order, confirmed by the Local Government Board and published in the London Gazette, to be an offensive business. The local authority is empowered to make by-laws regulating the conduct of any businesses specified in the Act, and the structure of the premises in which they are carried on. In default of the local authority making such by-laws within four months after the passing of the Act, the Local Government Board is empowered to make them. Section 11 of the Act empowers inspectors of the Privy Council to enter slaughter-houses and knackers' yards for detection of disease.

The Public Health (Ireland) Act (37 and 38 Vict. cap. 93) is laid down upon the same lines as the Public Health Act (England) 1872, but it deals with much simpler conditions of sanitary organisation than the corresponding Act for this country had to deal with. It numbers sixty-six sections. to sanitary authorities, it divides Ireland, as England is divided, into sanitary districts, to be called respectively, urban sanitary districts, and rural sanitary districts. sanitary districts include the city of Dublin, towns corporate with the exception of Dublin, towns having populations exceeding 6,000, and towns or townships having commissioners The rural sanitary districts include the under local Acts. area of every poor-law union, with the exception of those portions (if any) of the area which are included in urban sanitary districts. The urban sanitary authorities are the corporations of the city of Dublin and of other corporate towns. and the commissioners, municipal, town, or other, of the towns being within the definition of the Act as urban sanitary The rural sanitary authorities consist of the guardians of the union. The Act vests all powers relating to the treatment of disease, the establishment and maintenance of hospitals, the conveyance of the sick, the disinfection of clothes or dwellings, in the board of guardians of the union in which the sanitary authority is situate. The Act is enabled to deal directly with the question which has been the source of so much confusion in the operation of the English Act. provides (sec. 10) that every medical officer of a dispensary district shall be a sanitary officer for such district, or for such part thereof as he shall personally be in charge of, with such additional salary as the sanitary authority thereof may approve with the assent of the Local Government Board; and every sanitary authority, whether urban or rural, shall appoint such other sanitary officers, including a medical superintendent officer of health when deemed necessary, as the Local Government Board shall in each case direct, with such salaries or additional salaries as the said sanitary authorities shall determine, with the approval of the Local Government Board; and the said Board shall assign to the dispensary medical officers, and to the other sanitary officers, if any, and to the medical superintendent

officer of health, if such an officer be appointed for the sanitary district, their respective duties and functions in the discovery or inspection or removal of nuisances, in the supply of pure water, in the making or repairing of sewers and drains, or in generally superintending the execution of the sanitary laws within the district. The remainder of the Act, as being based on the same broad principles as the English Act, adapted to the requirements of Ireland, does not call for detailed analysis.

THE INTERNATIONAL EXHIBITION: SANITARY APPARATUS.

CHARCOAL AND ITS APPLICATION TO SANITARY PURPOSES.

Two Companies, having for object the introduction of charcoal as a common agent for dealing with excremental and sewage matters generally, appear among the exhibitors of sanitary apparatus in the International Exhibition. One of these Companies (No. 5961A in the catalogue) is the Carbon Fertiliser Company (Limited); the other (No. 6005) is the Universal Charcoal and Sewage Company (Limited).

The Carbon Fertiliser Company (Limited) has been established for the purpose of promoting the system of treating house refuse and sewage invented by Mr. Edward C. C. Stanford, F.C.S. The system is, as to the working, a modification of the dry earth system, so to speak, charcoal being substituted for dry earth; but the following especial advantages are claimed for it: onefourth only in bulk of the deodorant is required to produce as complete an effect, the whole manurial value of the excremental matters is retained, and the mixed charcoal and excrement supplies the material for supplying the deodorant (Cycle charcoal). In the first instance a charcoal prepared from seaweed is used to start the process. This charcoal can be placed in the market, it is said, at a cost so small as to make it available for use by local authorities. The mixed charcoal and excrement is then dealt with in the following manner:—The removed material is distilled in iron retorts, the products being ammoniacal liquor,

tar, and gas. "From the liquor, sulphate of ammonia and acetate of lime are obtained. The charcoal remains in the retort, and can be used again any number of times for re-charging the closets. At every re-burning it increases by the addition of the carbon derived from the excreta. The carbon contains all the potash and phosphates, and is worth about £5 per ton. When mixed with the sulphate of ammonia obtained by distillation, it forms the nitro-carbon manure, about £10 per ton." Claim is made for the Cycle charcoal as being a peculiarly valuable filtering medium.

Mr. Stanford has given much attention to the action of charcoal upon excremental matters, and as the result of his researches he has come to the conclusion that it does not act as a powerful oxidiser, as many chemists believe. He states the conclusions from his various researches on the subject as follows:—

"1. Charcoal mixed in equal weights with nitrogenous organic matter acts simply as a drier. 2. It does not act as an oxidising agent when thus applied, and does not conduce to the formation of nitrates. 3. It is probable that after the lapse of some time, and if the mixture be artificially dried, a small proportion of nitrogen may be eliminated in the form of ammonia. 4. That for all manufacturing or manurial purposes, there is but little loss of nitrogen in such mixtures."

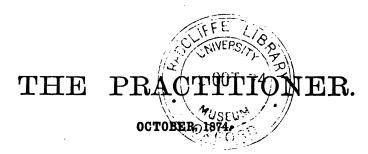
We have had the opportunity of observing the deodorant and conserving properties of seaweed charcoal when cast over excrement; and have examined several specimens of mixed excrement and charcoal after the material has been stored many months, simply protected from wet. In these specimens the absence of odour was complete, although the structure of the excrement (if we may so describe it) was clearly visible.

The Carbon Fertiliser Company (Limited) exhibit specimens of apparatus adapted for the application of charcoal to excrement, urine, slop, and sewage disposal in houses, barracks, schools, towns, &c.

The Rivers Pollution Commission, in their Fourth Report, p. 54, in speaking of certain experiments made by them with seaweed charcoal treated with urine (87 gallons to 1 ton), say: "We consider the result of the experiment very satisfactory, for it shows that seaweed charcoal furnishes the means of

transforming excrementitious matters into an inodorous solid, which retains for several months, and probably for years, about three-fourths of the fertilising constituents of the original manure (1.45 per cent. of nitrogen). Dry earth makes only a very distant approach to seaweed charcoal in this preservative action. Thus the dry clay soil used in the earth-closets at Wakefield prison, after receiving no less than 144 gallons per ton, retained after drying only '392 per cent. of total combined nitrogen."

The Universal Charcoal and Sewage Company (Limited) has for its speciality of operation the carbonisation of street-sweepings. From these sweepings, hitherto the despair, as a rule, of local authorities, and conveyed to whatever waste place could be found in which to get rid of them, this Company makes a charcoal which contains 20 per cent, of pure carbon. This charcoal is available for all purposes of dealing with excremental matters and sewage to which charcoal can be applied, as well as for other purposes. It is, as may be gathered from its source, peculiarly cheap, and in this cheapness rests the hopes of the Company of its large adoption. It may be used for dry closets, for tub closets, for sewer ventilators, for deodorising middensteads, privies, stable manure, stables, and cow-sheds, with advantage and facility. Like the Company previously described, and like Companies in general, this Company states many economic arguments in favour of the use of charcoal, and especially of street-sweepings charcoal, for the disposal of excremental matters and sewage; but the Universal Company is also not unmindful of the difficulties which beset local authorities in dealing with other refuse matters than excrement and sewage. Of the ashes, it proposes to use the coarse for the furnaces of its carbonising works, and the fine to assist in drying the deodorised excreta; the garbage and offal it proposes to mix with charcoal and then grind up for manure; the broken pottery it would grind to powder for the manufacture of mortar and cement; metals must find their way to the metal dealers; and, finally, straw, paper, rags, &c., it would heap together in open air, deodorise, and leave until the mass became a compost useful as a manure either alone or mixed with the general manure.



Original Communications.

THE ILLNESS OF THE LATE DR. ANSTIE.

It has occurred to me that all the readers of the *Practitioner*, whether they were personally acquainted with the late Editor or not, will be desirous to know whatever can be told them about the causes and manner of his premature and much-lamented death.

During the month of August, Dr. Anstie, who was engaged in the preparation of a second edition of his book on Neuralgia, and who had otherwise undertaken a good deal of literary work, was at the same time called upon for an unusual amount of professional exertion, both as regards the number and the distance of his patients. His family went to a country house at Finchley, but he was compelled to forego a holiday, and to be content with occasional visits to them. Fully occupied in the day, I believe that he also sat up to a late hour of the night. He complained of feeling tired and jaded; and he had of late begun to look older than his years.

On Saturday, the 5th of September, he expressed himself to me as being worried and overdone; and gave me an account of an investigation in which he was engaged, which had for its object to discover the causes of a sickness and mortality which had visited the schools of the Patriotic Fund at Wandsworth. He described certain insanitary conditions which had existed in these schools, and told me that he meant to spend the whole of the following afternoon in examining them, and that he hoped to discover all the causes of mischief. The children who had died had suffered from sudden and acute idiopathic peritonitis, which terminated fatally in a few hours from the commencement of the attacks.

On Tuesday, the 8th of September, Dr. Anstie called upon me about ten o'clock at night. He said that on Sunday he had taken part in the post-mortem examination of one of the children who had died of peritonitis, that during this examination his finger had been wounded by a needle, and that he was very uneasy about it, as he "felt poorly." He said also that he had sucked and washed the little wound as soon as it was inflicted.

The only idea that occurred to me in connection with this accident was that of local mischief, and I examined his finger carefully. The scratch was over the middle of the dorsal aspect of the second phalanx of the medius of the right hand. It was perhaps a third of an inch long, and was covered by a little dried exudation, around which was a red margin not exceeding a line in width. There was no swelling, no increase of temperature, either in the phalanx or in the finger generally, no uneasiness either in the hand or in the arm, and no restriction of movement. I said that I thought no harm would come of it, and he replied that I had relieved his mind, and that he would go to bed at once and have a good night's rest.

On the following day, Wednesday, the 9th, I did not see him. I called at his house in the evening, but he had gone out to dinner. His servants said that he seemed "very poorly." I learnt afterwards that he had been so chilly that he had a fire lighted, and put on an overcoat whilst sitting by it, and also that it hurt him to move his arm, so that he required assistance in order to take this overcoat off and to put it on again. At dinner he ate little, and seemed depressed in spirits.

On Thursday morning, the 10th, about ten o'clock, his servants sent for me to see him. I found him in bed, with a perfectly dry, hot skin, a tongue so dry that he could scarcely articulate, and complaining of intense headache. The urine passed during the night was of natural aspect. I knew that he had more than

once had a sharp attack of ephemeral fever from some comparatively trifling cause, and also that, when restless or in pain (he formerly suffered much from neuralgia), he sometimes took a dose of morphia. It struck me that the dry tongue might be due to such a dose, and I saw nothing to make me think very seriously of the case. I looked at the finger, but the red margin around the crust had disappeared. I advised him to take a minim of tincture of aconite, in water, every hour, until diaphoresis was produced; and, with his concurrence, wrote the necessary prescription.

In about three hours I visited him again. The skin was still dry and hot, the tongue still dry: the head, he said, was in less pain. I inquired about morphia, but he had not taken any; and he assigned as a reason for not having done so that his bowels had not been relieved for four days. He had taken two aloetic pills just before my visit. I told him to stop the aconite, and to take citrate of ammonia in effervescence, with the ammonia in excess. He was also to drink freely of Apollinaris water, and to have a pint of milk and a cup of beef-tea during the afternoon.

At 8 P.M. I found the state of the skin unchanged, but the tongue less dry. The bowels had been moved several times. There was still much headache; and he complained for the first time of severe pain in the right pectoral region. The face looked dull and heavy, and he had been very restless, rolling and turning about on the bed and disarranging the coverings. The servants said that he had been wandering in his mind, but he answered me quite rationally when I spoke to him; and I thought they had been deceived by the state of his tongue, which rendered his speech difficult to understand. His pulse was 96, temperature 103.5. I desired him to continue the citrate of ammonia, the Apollinaris water, the milk and the beef-tea, left a trusty servant in charge for the night, and wrote to Mrs. Anstie to inform her of his state and to ask her to return home without delay.

On Friday morning matters were worse in all respects, and he complained greatly of the pectoral region. He had been very restless and distinctly delirious during the night, and could only be recalled to consciousness for a few moments. Mrs. Anstie arrived about half-past eleven, and he knew her, but his mind soon wandered away. I then asked for a consultation, and at 3 P.M. was so fortunate as to obtain the aid of Dr. George The conditions were essentially unchanged, except that the temperature had risen to 105.1. No mischief within the chest could be discovered by auscultation, but the tenderness of the pectoral region was extreme, so that the lightest touch of a finger produced an exclamation of pain. There was no pain, swelling, or tenderness of the arm, but on the side of the chest, at the lower border of the axilla, there was a patch of cutaneous redness, very irregular in outline, and which, if it had been circular, would probably have been two-and-a-half inches in diameter. There was no tenderness here, no hardness, no swelling, and the redness disappeared under finger-pressure, to return when it was removed. The greatest tenderness was over the body of the pectoral muscle, but here also no swelling or Dr. Johnson suggested that the hardness could be detected. mischief might perhaps localise itself in this part as phlegmonous erysipelas. He approved of what I had done, and concurred with me in thinking it undesirable to give alcohol while the skin remained perfectly dry. At 9 P.M. we met again, and Dr. Burdon-Sanderson gave us the benefit of his assistance. A very copious perspiration had commenced about half an hour before the visit; but the temperature was still over 105, and the other conditions were unchanged. We determined to apply a poultice over the painful pectoral region, to give half an ounce of brandy every hour, and to continue the other treatment, At 3 A.M. on Saturday I saw the patient alone, and thought him a little better in all respects. The perspiration had continued in a moderate degree, the restlessness had much abated, the temperature had fallen to 102, and the expression of the face had improved, so that I was greeted with something of the natural smile. At 9 A.M. I again met Dr. George Johnson; and we then found that pleuro-pneumonia of the right side had developed itself, and that the urine was loaded with albumen. The general symptoms were somewhat lightened, the expression of the face continuing better, and the temperature having fallen to 101. red patch and the general conditions of the axillary and pectoral regions remained the same, save that the tenderness was less .. .**.**

The pulse, which had never before exceeded 96, had apparent. risen to 110. Upon the whole, we entertained a hope that the pleuro-pneumonia might be the only local change, and that the patient might struggle through. But at noon, when I next saw him, the pulse had risen to 120, with an occasional intermission. His brother-in-law, Dr. Buzzard, who had been telegraphed for, had just arrived, and whilst we were holding a consultation the nurse suddenly recalled us to the sick room. There had been an effort at vomiting; the face and finger-nails were becoming livid; the power of swallowing was failing, and the end mani-The symptoms seemed to point to the formation of festly near. a clot in the heart or great vessels; and at half-past two the last breath was drawn, fifty-two hours after I was first called to him on Thursday morning. No post-mortem examination was I have purposely abstained from expressing any opinion about the nature of the malady, and have confined myself to an endeavour to state the facts as they occurred.

R. BRUDENELL CARTER.

[The following obituary notice, a portion of that which appeared in the *Lancet* of the 19th of September, and which has since been amplified in a few details by the original writer, is here reprinted by permission.]

Francis Edmund Anstie was born at Devizes on the 11th of December, 1833. He was the second son of a manufacturer in easy circumstances, and his family had been established in the From this, and from their locality for several generations. personal qualities, it came about that his father held an almost patriarchal position over his people, and employed many whose ancestors had worked for his own for more than a century. The eldest son was designed to carry on the good traditions of the house; and Francis, after being educated at a private school in Devizes, which he left in 1849, was articled in the following year to his cousin, Mr. Thomas Anstie, a medical practitioner of the town. According to the custom of those days, he remained with his cousin three years, and entered at King's College in 1853. He passed through the ordinary medical curriculum with credit, and gained the Gill Prize for general proficiency at the

end of his first winter session. He was a steady worker, both at the college and in the hospital, where he was an enthusiastic disciple of Dr. Todd, under whom he served as clinical clerk, and whose teaching gave a manifest colour to his whole professional life. In 1857, being as yet undecided with regard to his future line of practice, he took the post of resident physicianaccoucheur's assistant in the hospital, where his kindly and genial disposition endeared him to his fellow residents, Dr. A. Meadows and Mr. Christopher Heath, and his fine voice contributed not a little to the attractions of the musical evenings which many of the old students will so well remember. In the autumn of the same year he took his M.B. degree at the University of London, and was for some time occupied in administering chloroform for Sir W. Fergusson. In 1858 he proceeded to his M.D. degree, and after this lived for a short time in Stamford Street; but in 1859 he removed to Onslow Square, and was appointed physician to the Chelsea Dispen-By this time he had determined to practice medicine; and having been appointed pathologist to the Westminster Hospital, he was elected assistant-physician and co-lecturer on Forensic Medicine in 1860, in the vacancy caused by the transference of Dr. Russell Reynolds to University College. He subsequently exchanged his lectureship for that on Materia Medica, which he held for many years, his course being devoted rather to the therapeutic actions of drugs than to matters of mere detail. At this time his house in Onslow Square was the place of meeting of a circle of friends, who came together on Saturday evenings for talk and music, and who aimed at a high standard of artistic, literary, and scientific conversation, in which Dr. Anstie was not only well qualified to take a prominent part, but also, by his frank and genial temperament, to form a bond of union between his associates. he married, and from thence forward devoted himself far more closely than before to the practical business of his calling, displaying a power of steady and sustained work that had previously lain in abeyance, and that rapidly brought him into the front rank of his contemporaries. In 1863 he removed to the house in Wimpole Street, in which the rest of his life was spent, and in the following year published his well-known treatise on

Stimulants and Narcotics, chiefly the result of experimental research conducted at the Westminster Hospital. He next contributed the articles on "Alcoholism" and on "Neuralgia" to Reynolds's System of Medicine; and in 1866 delivered the Lettsomian Lectures before the Medical Society of London, taking "Facial Neuralgia" as his subject. In 1867 he delivered a course of lectures on the "Prognosis and Treatment of Acute Diseases," before the Royal College of Physicians. His tenure of office as assistant physician to his hospital was prolonged for thirteen years, during which he applied himself to the work of the out-patient department with an energy and solicitude that never flagged. About a year ago he succeeded to the post of physician, and was enabled to give full scope in the wards to those powers of clinical teaching which his long work among out-patients had cultivated to the utmost-For a short time he shared the lectureship on Medicine with Dr. Basham, but had lately given the full course in a manner which elicited the warm admiration of those who heard him. Besides his appointments at the Westminster Hospital, he was physician to the Belgrave Hospital for Children, and consulting physician to the Royal South London Ophthalmic Hospital. It need no longer be a secret that the most flattering overtures were made to him from New York, to settle there as a hospital physician and consultant, and a lecturer on the principles and practice of physic; but family reasons, and the feeling of growing success in England, prevented him from assenting to a proposal which was none the less gratifying that it came from those who knew him only by his professional reputation. His last work, and that on which his future fame will chiefly rest, was his admirable treatise on Neuralgia, on a second edition of which he was engaged at the time of his decease.

Besides his books, Dr. Anstie was a frequent writer of more fugitive literature. He contributed occasional articles on scientific subjects to various non-medical papers, and was for years a member of the editorial staff of this journal. In that capacity he was the originator and the chief member of the Lancet Commission to inquire into the state of workhouses, and not only laid down the general plan on which the pro-

ceedings of the Commission were to be carried on, but also took a principal part in conducting the inquiries and in writing the reports. In July 1869 he became sole editor of the *Practitioner*, which during the first year of its existence he had edited in conjunction with Dr. Lawson, and which has ever since been indebted for its high position to his sound judgment, his constant industry, and his ready pen.

Dr. Anstie became a Fellow of the College of Physicians in 1865, and was soon recognised as a power in that venerable institution, where his voice was raised in support of every proposal which was calculated to increase the dignity or to extend the usefulness of the College. He was much interested in the recent improvements in the manner of electing Fellows, as well as in the negotiations for the conjoint scheme of examination; and he was the prime mover of the petition to the Premier on the subject of the overcrowded dwellings of the poor. In two directions, therefore, in the reform of workhouses and in the limitation of the power of railways to sweep away needful habitations, his efforts led immediately to legislation for the public good.

It remains only that we should endeavour, for the benefit of those to whom he was not known, to sketch in some faint and imperfect outline the personal character of the departed. Anstie combined with his versatile and unflagging industry a singularly affectionate and enthusiastic temperament, and a kindness of heart that never varied. He had no enemies but those whose enmity was a tribute to his worth. He had more and more warmly attached friends than fall to the lot of any but the very few. Among those who followed him to his grave on Wednesday there must have been some forty or fifty who had been his fellow students, and whose cordial intimacy with him had stood the test of one-and-twenty years. It was well said of him by the Times that "his hatred of oppression or wrongdoing, his love of truth for its own sake, his generous and chivalrous character, had endeared him to all who were brought within the range of his personal influence. Of a warm heart and a somewhat combative temperament, he was engaged in many controversies, but he never suffered his share in them to degenerate into personality, and never forgot to distinguish

between the abuses he condemned and the possibly innocent persons who administered them." He was, indeed, "sans peur et sans reproche." By those who were so long associated with him on this journal he will be deeply and sincerely mourned. and more deeply still, but not more sincerely, by the widow and three children upon whose grief we cannot venture to intrude. But a few days before his fatal illness he walked with Mrs. Anstie past the little churchyard of Friern Barnet, and, observing the peacefulness and beauty of the spot, remarked that it would be good to rest there. The half wish implied in his words has been respected, and at Friern Barnet his mortal remains have been deposited. The history of the school illnesses shows that he was, although indirectly, a victim of the popular indifference to sanitary matters, and it is necessary to borrow largely of his own charity in order to forgive the mismanagement which laid him low.

Dr. Anstie was a physician of the type which is the pride of English physic and the crown of our schools of medicine. Or rather it should be said he was a typical physician of this class. His intellectual culture was not inferior to his strictly medical culture, and this was of the highest. The one, in fact, formed, as it were, the fitting setting for the other. Complete in the technical knowledge of his profession, he brought to its application in actual life that happy combination of scientific and practical acumen, conjoined with a peculiar charm of manner, which make the physician in the truest and best sense of the word. Prompted by a thorough love of medicine, he laboured closely and hard at some of its most complicated problems, and he has left results of enduring value both scientific and practical. His scientific work is characterised by keen insight into the problems with which he dealt, and by a rare appreciation of the light in which his researches should be regarded, as contributing on the one hand to existing knowledge of the subjects to which they referred, and on the other to the furtherance of investiga-His practical work was distinguished by the skill with which he sought to educe principles of treatment from pathological and physiological data, and rationalised necessary empiricisms. Widely read in the literature of his profession.

he brought a richly stored memory to his editorial and literary duties. He was an eager upholder of the dignity of medicine, and an unsparing critic of whatever militated against the good name of the profession within or without its ranks. A clear and incisive style gave power to a pen which, if it were keen, was never unkind, and which has performed an active and influential part in all the great questions which have agitated medicine in its social and political bearings for some years past.

The substantial fruits of Dr. Anstie's labours were about to be gathered when, in the earnest pursuit of a duty, he accidentally received the infection which killed him. Medicine, although rich in sterling workers, can ill afford to lose such a man, and the manner of his death aggravates the painful sense of his loss. It was too costly a life to have been sacrificed prematurely in so pitiful a way.

ATROPINE AS AN ANTIDOTE TO MORPHIA.

BY S. WORDSWORTH POOLE, M.D., SIDCUP.

Many experiments on the lower animals have been performed by Dr. Reese, of Philadelphia, and others, to prove the antagonism of these two narcotics; but they cannot decide that in man the one drug is an antidote of the other; that is, according to the derivation $\dot{a}v\tau l - \delta l\delta\omega\mu\iota$, the one ought to be given to counteract the other, and for this reason: animals exhibit an extraordinary tolerance of these poisons—one dog swallowed 8 grs. of atropine one day and 14 grs. the next, and yet completely recovered without any means being taken to save it.

It is plain that observations to be of value to man must be made on man; and as there are at present but few, I hope the following may be of use in determining a question of such grave importance.

The patient was a lady of 28, whose temperament, by nature keen and nervous, had been rendered doubly so by a series of trials both mental and physical, enough to shake a constitution of iron. When quite young she had been affected with brain fever, and the striking feature of that disease, delirium, always showed a tendency to return after any excitement, especially after parturition, and on two occasions lasted for about three days. On the other hand, slight fatigue was often followed by syncope, and she would lie in a trance, scarcely breathing, until stimulants were freely administered.

On the 7th July I had to perform a serious operation on one of the members of her house. Her keenest feelings were all astir, and there was a deep flush on the cheek I never saw

before. For two weeks there had been headache and giddiness, and she had fallen downstairs from vertigo.

Suddenly, whilst at tea, an attack of hysteria came on—sobbing, raving, and ejaculations of mental agony, and attempts to tear the hair and face. Then followed two symptoms never present in any of her former attacks—clonic spasms of the oral muscles and slight opisthotonos.

Stimulants were freely given, but to no purpose. It was difficult to keep her from self-injury; and in order rapidly to control and relieve her, I injected one grain of hydrochlorate of morphia at 7 P.M. She was conscious of this, and became for a while more violent and vociferous, but gradually grew manageable, though talking incessantly, and about 8.30 walked with help upstairs, and was laid in bed. Though morphia had never before been injected, the liquor opii had been thus employed in doses of 60 drops as an anodyne, with moderate effect, several times, and it had not produced a symptom which was now very marked, extreme itching about the nose.

At 9 the breathing became very slow, so that she had to be held sitting, as it threatened to stop altogether when lying down. She grew quite still until roused, when the talking went on. As she complained grievously of being kept up, and as the pulse went beating steadily on, I allowed her to lie down, keeping my ear over the heart, to hear if the respiration would return; but the moments sped on, and no breath was drawn, and the trial was abandoned. Brandy had been very freely given; now ammonia was tried by the nostrils; then Silvester's method; then forcible movements; for the respirations stopped, the face became deadly pale, and the pupils were mere pinpoints; the voice was silent, and every voluntary movement gone.

About 11 P.M. the horrible feeling was forced upon me that in a few minutes the narcosis would prove fatal.

One resource was left, the injection of atropine, and this had not been tried, as there were not present in my mind many instances of its success, and I had frequently found this alkaloid produce much delirium.

The American Medical Times records a case in 1871, where a man swallowed and absorbed an ounce of laudanum, equiva-

lent to 24 grains of opium, became deeply comatose with four respirations per minute, and recovered after having $\frac{2}{5}$ of a grain of atropine injected in the course of eighteen hours, $\frac{1}{30}$ at a time. In my case, though the dose of the opiate was much less, the coma came on more rapidly, and the respirations were not one a minute.

The patient being propped up in an arm-chair, I injected of a grain of sulphate of atropia, and sat down watching with intense interest for a change. In ten minutes the pupils were dilated well-nigh to the full, and the breathing became regular, though very slow; but other changes there were none.

Soon after, Mr. B. P. Matthews, of Chiselhurst, arrived. On taking into account the giddiness, the suffusion of face, and the convulsions, his opinion was that the case was one of idiopathic congestion of the brain, with narcosis superadded. Cold water was applied to the head, and hot water to the feet; and we kept putting fluids into the mouth in order to provoke action of the muscles of deglutition, and thus keep up some vitality, for there was complete acinesia as well as anæsthesia. Altogether her appearance was appalling, and too painful to be minutely described. About 3 A.M. vomiting was induced several times, and a slight moan indicated the vestige of sensation; but the breathing grew stertorous, and the pulse, which had all through beat on manfully, began to flicker, and all hope was abandoned.

I have now to record the most striking instance of successful treatment I have ever witnessed. At 6 a.m. she was laid down, and the large indiarubber bottle, hitherto at the feet, was filled with boiling water and applied to the præcordia. The effect was marvellous, well-nigh miraculous. The patient raised herself up, and with both hands tried to push the bottle away, uttering the word *please* in accents indistinct yet recognisable. The cue to the recovery was found, and it is needless to describe the after stages.

Anorexia and prostration lasted for several weeks.

As illustrating the antagonism of the drug, this case presents the serious defect that it is impossible to estimate how much of the cerebral congestion was toxic and how much idiopathic. But this much is certain: the subject was in articulo mortis

from failure of respiration, with contracted pupils, and immediately on the atropine being circulated through the system these two symptoms disappeared. As these are both acknowledged consequences of opium narcosis, it is plain that the atropine saved my patient from her more threatening foe.

Can this agent counteract the coma or stupor produced by alcohol?

As hypodermic injections are destined to play so great a part in medicine, it may be even in toxicology, one can hardly overstate the need for determining the question of antidotes.

How many of us have not wondered that the serpent, the most venomous of all created things, the very incarnation of evil, should have been worshipped throughout all antiquity as "the good demon," and should have been even to the present day accepted as the emblem of the healing art? Why ophiolatry should have been so general I do not comprehend, in spite of the learning bestowed on the subject, for it existed long before the brazen serpent cured the plague-struck Israelites; but the special assignment of this animal to the god of medicine seems to me a recognition of the fact that by our art the poisonous principles found in nature were converted into agents for the cure of disease—(the idea that it was on account of vipers being often employed in pharmacy is too trivial to be entertained); and the acknowledgment of this great truth seems almost prophetic when we consider how potent and subtle are the remedies now employed, and above all how an instrument closely resembling in its mode of action the tooth of the envenomed beast forms part of the armamentarium of every son of Æsculapius.

NEPHRALGIA, LITHURIA (LITHIASIS), AND OXALURIA.

THERE are certain functional disorders of the kidneys and their excretion which give rise to symptoms more or less severe and painful, and which may either by judicious treatment rapidly subside, or by neglect or errors of diet and regimen eventually lay the foundation for organic disease of the kidneys and the formation of a calculus within them.

The source of such disordered function is clearly to be traced either to errors of diet and functional disorder in the organs of nutrition, particularly of the liver, or constitutional or hereditary predisposition. In either case the hepatic function is largely implicated, and no plan of treatment can be thoroughly curative which does not carefully consider the important relation of this organ to the urinary excretion. The first term in this article represents a group of symptoms essentially subjective; the second expresses objectively a fact, a visible and demonstrable alteration in the proportion of a leading constituent of the urine; and the third is a term formerly employed to express what was supposed to be a definite and special morbid process with accompanying specific symptoms, but which will presently be explained as only another form of lithiasis, the oxalate of lime found in the cases of so-called oxaluria being a resultant of chemical change taking place in the urine by the oxidation of uric acid after excretion. It will presently be demonstrated that the oxidation of uric acid produces oxalic acid and urea, with the further formation of oxaluric acid and ammonia. well-known powerful affinity of oxalic acid for lime will readily explain the readiness with which oxalate of lime occurs in

urines, when an oxalurate of ammonia comes in contact with the numerous lime salts always present in this excretion. For the present the chemical interpretation of these changes may be postponed till the symptoms to which they give rise have been described.

A generic term, nephralgia, is employed to designate the group of symptoms characteristic of gravel or crystalline sediments of uric acid. Nephralgia may be defined as pain, uneasiness, or discomfort in the lumbar or renal region, extending from one or other kidney through the ureter to the neck of the bladder and extremity of the urethra, accompanied by great and often distressing frequency of micturition, without febrile disturbance or other symptoms of inflammatory action, but with marked evidence of sympathetic irritation in organs connected with the kidneys, through the solar, renal, and intestinal ganglia, often expressed by nausea, even vomiting, with numbness of the external cutaneous surface of the thigh. The urine is sometimes scanty, often abundant, highly acid, readily depositing a sediment of uric acid, crystalline or amorphous—most frequently the former, the crystals being, microscopically, lozenge-shaped or rhomboid, barrel-shaped or columnar, simply stellar, or acicular-stellar, and hastate, and rarely as cubes. But it must not be overlooked that urine may contain an abnormal proportion of lithic acid, although no crystalline sediment is deposited When largely in excess, however, the deposit occurs as a red sand, having the appearance of Cayenne pepper: when amorphous, the deposited material is termed gravel, and occurs in masses varying in size even from a pea to a millet-seed.

These uric acid sediments are also accompanied by an abundance of mucous or exudation corpuscles, derived from the renal tubes, the calyces, infundibula and ureters, expressive of the irritation to which the protective epithelium of these outlets has been exposed.

Nephralgia as a symptom may be regarded, then, as expressive of a gravelly or lithic acid diathesis: it arises from the irritation of gravelly particles of lithic acid (amorphous), or of crystalline grains of lithic acid or lithates, detained in the renal tubes, and till washed out by the urinary stream giving rise to the group of symptoms above detailed. Bearing this pathological

fact in mind, the remedial agency of diluents, of alkaline citrates and tartrates, or any agent which, while it dilutes the urine and increases its quantity, also renders the uric acid more readily excreted, will readily be admitted. Nephralgia arising from the above causes is recognised without much difficulty, and its temporary relief easily and promptly obtained. The potash salts as effervescing citrates, mild mercurial alteratives and saline purgatives, especially the Carlsbad or Friederichshall waters, speedily effect the desired relief.

As nephralgia is symptomatic of a gravelly irritation of the urinary passages, so, if the gravelly condition continues unrelieved, nephralgia becomes the sign of a calculous disease of the kidney; and, with the addition of symptoms hereafter to be described, is the exponent of that form of renal disease.

In the meantime, however, it appears desirable to describe those minor forms of urinary disturbance, the symptoms of which are more obscure, more liable to erroneous diagnosis, and, in times past, misled many as to their true cause and origin. The disorders referred to are lithiasis or lithuria, and oxaluria. Dr. Prout and the late Dr. Golding Bird described the latter as a distinct and specific form of disease, referred chiefly to the nervous system; ignoring altogether the functional disturbance in the important blood-purifying organ, the liver.

. It may be convenient, first, to study and compare the symptoms of what was recognised formerly as oxaluria, with those which are expressive of what is now termed lithuria; and if identity of force and character can be recognised in typical cases, the remaining proof that oxaluric acid is always formed by the oxidation of uric acid, and that oxalate of lime as a urinary sediment is the invariable sequence of the lithæmic diathesis, will be unanswerable proof of their identity. Both lithuria and oxaluria have the following symptoms in common. Frequency of micturition, chiefly noticeable at night; occasional sense of heat, even of scalding, in the urethral passage; a certain uneasiness at the urethral outlet, temporarily removed by emptying the bladder; dyspeptic symptoms of variable character; flatulent uneasiness after food; an irregular, often intermitting pulse; occasional palpitation of the heart; sluggish, torpid bowels; great depression of spirits, often taking the NO. LXXVI.

form of severe hypochondriasis; restless and unrefreshing sleep; a constant sense of physical weariness and languor, with unusual mental indolence. These symptoms, frequently met with in gouty subjects, and also in those who are free from the typical symptoms of that disorder, are more commonly attributed to simple dyspeptic causes, the more ostensible symptoms being those which represent disorder in the digestive apparatus, but which in reality, as Dr. Murchison has so ably shown in his Croonian Lectures before the Royal College of Physicians, are to be traced to functional disturbance in the Those symptoms described by Dr. Golding Bird under the title of oxaluria belong to a class of disorders characterised by malassimilation, and can be traced chiefly to functional derangements of the liver arising from errors of diet, excess of or disproportioned amounts of fermented liquors, that is, disproportioned to the amount of bodily exercise necessary for their conversion into carbonic acid and water. The want of the exhilarating influence of bodily exercise, particularly if combined with constant tension of the mental faculties, anxieties of business, devotion to the demands of professional life, &c. are calculated to promote this functional disturbance quite as much as dietetic errors or the habitual although moderate use of fermented stimuli.

Such then are the causes which are the common origin of the disorder described as lithiasis, but which is more expressively designated as lithuria (Murchison), and that allied, if not identical, disorder termed oxaluria. The functional disturbances and symptoms in oxaluria are similar to what are observed and described as characteristic of lithuria: flatulent distension after food, acid eructations, frequent attacks of heartburn and gastralgia, irregular action of the bowels, constipation with hardened stools, occasional attacks of palpitation of the heart, with almost universally an irregular or intermitting pulse. The most prominent symptom, and that which forms usually a leading feature in the description by the patient of his symptoms, is the languor and weariness and sense of bodily indolence which beset him. Mental indolence, with a proneness to succumb to feelings of hypochondriasis, and a tendency to various delusions, are commonly observed in severe cases.

This oxaluria, or the oxalic acid diathesis, was first recognised and described as a distinct pathological condition of the urine by the late Dr. Prout, who described the symptoms of this diathesis as belonging to the irritable or nervous class, rather than to the congestive or inflammatory.

This diathesis he described as marked by irregularity of the heart's action, intermission of the pulse, palpitations, flatulence, and more or less hypochondriasis, with depression of spirits. Dr. Golding Bird fully endorsed these views, and in his work on Urinary Deposits recognised this diathesis under the term oxaluria. Dr. Owen Rees, so far back as 1845, expressed doubts as to the existence of this so-called oxalic diathesis, and in his work on the Analysis of the Blood and Urine in Health and Disease, p. 147, thus states his views:—"The state of the system on which the secretion of urine characterised by deposits of oxalate of lime depends is not well investigated. appears some degree of probability that it is connected with the formation of lithic acid in excess, and with a state of system in which a considerable quantity of urea is secreted." In endeavouring to trace the source of oxalic acid in the urine, it must not be forgotten how constantly it is found as the product of the oxidation both of animal and vegetable substance. It is well known that perfectly fresh urine presents no trace of oxalate of lime crystals, but that, allowed to stand freely exposed to the air, an abundant crop of these crystals may be found in the sediment.

Chemistry proves that uric acid when acted on by oxidizing agents is converted into urea, allantoin, and oxalic acid. The chemical relation of oxalic acid to uric acid and the urates has been fully investigated in recent times, and chemists concur that oxalic acid is one of the products of the oxidation of uric acid. Uric acid is converted into oxalic acid and urea by the addition of oxygen and water. Uric acid mixed with a fermenting agent (yeast) and an alkali, with elevation of temperature, is decomposed into oxalic acid and urea. Uric acid treated with water and peroxide of lead is converted into allantoin, oxalic acid, and carbonic acid. Uric acid oxidised by nitric acid yields a large quantity of parabanic acid, oxalic acid, and ammoniacal salts. Many other examples might be cited

to prove that the oxidation of uric acid results in the formation of oxalic acid, urea, and other compounds.

The urates undergo similar decompositions. Peruvian guano is almost pure urate of ammonia, but becomes by oxidation in the hold of the ship during the voyage largely converted into oxalate of ammonia (Gmelin).

In the "Proceedings of the Royal Society," vol. xii. No. 95, there will be found a very valuable contribution to the chemistry of this subject by Edmund Schunck, F.R.S., entitled "On Oxalurate of Ammonia in the Urine." The process for obtaining the oxalurate is given in detail, and the conclusion arrived at is that there can be little doubt that in the animal frame, as in the laboratory, oxaluric acid is formed by the oxidation of uric acid, which is its only known source.

This conversion of oxaluric acid into oxalic acid and urea may take place in any part of the urinary apparatus after the urine has been once secreted; and hence an intelligible explanation is offered of the possible formation of oxalate of lime, whether in the renal tubes or other parts of the renal outlets. Yet this can happen only when within the body it meets some agent capable of effecting its decomposition into oxalic acid and urea. Any undue proportion of either acid phosphates, or even the basic phosphates of soda, might effect this, as both acids and alkalies are capable of effecting its decomposition.

Such are the leading and most characteristic chemical relations of oxalic acid to urea, uric acid, and the urates. All urines, whether derived from healthy individuals or those suffering from disease of the most varying character, are capable of forming oxalate of lime crystals. This sediment, then, is not significant of nervous depression or hypochondriasis, nor specially of dyspeptic disorder, any more than it is significant of emphysema, chronic bronchitis, phthisis, or even diabetes, in each of which sediments of oxalate of lime in greater or less abundance frequently occur.

Oxalate of lime as a sediment in the urine is of no other significance than as an indication of lithuria, an expression of a lithic acid diathesis. When seen in the urine immediately on being passed, before such urine has time to cool, it signifies that exalurate of ammonia has undergone decomposition in the

urinary passages, and that the possibility of calculus is strongly suggested.

The symptoms, then, of what was formerly called and recognised as oxaluria may now be accepted as indicative of a lithæmic diathesis, which has been traced by Dr. Murchison with such eminent success to functional derangement of the liver.

The parallelism between lithuria and oxaluria has been traced through the symptoms characteristic of either. The chemical relationship between uric acid and oxaluric acid, the evolution of oxalurate of ammonia out of oxidised uric acid, and the ready formation of oxalate of lime whenever oxalurate of ammonia is brought into contact with lime salts, complete the proof of the identity of lithuria with oxaluria. If further demonstration were needed, it might be found in the identity of the treatment, whether medicinal or dietetic, which are equally serviceable, whether the disorder be viewed as lithuria or accepted as expressing a diathesis distinct therefrom.

STRANGURY FROM AN UNUSUAL CAUSE.

BY EDWARD ATKINSON,

Surgeon to the Leeds General Infirmary, Lecturer on Comparative Anatomy, Leeds School of Medicine, &c.

THE symptom known by the name of strangury, and implying irritation of the whole or part of the urinary tract, is produced by certain agents either taken internally or applied to the skin.

- 1. We all know that turpentine given as an internal remedy will often, unless carefully guarded, cause strangury: sometimes it will do so, though never so cautiously administered. Occasionally, though much less commonly, it will do so when used as an external application. This seems to be due to the irritant effect produced on the kidneys by that agent.
- 2. Again, in some sensitive people, such, for example, as have suffered previously from spasmodic stricture, an overdose of alcohol will induce strangury—especially after exposure to cold. This is due to irritability of the muscular fibres surrounding the neck of the bladder.
- 3. Cantharidine, whether it be employed internally, or externally as a blister, is the most common cause of this distressing symptom.

I have lately seen it produced by a totally different agent. The patient was a gentleman of 48, robust, stout, and generally healthy, very abstemious, but of (perhaps inherited) gouty diathesis. Coming out of church in the dark, he stumbled, and slightly twisted his leg, which was followed by painful swelling of the inguinal glands. In a week the swelling assumed the characters of gouty inflammation, and soon after an erysipolatous blush appeared over the groin and upper part of the thigh.

I painted it with tincture of iron, and the following day I found him suffering from very severe strangury. Within twenty-four hours the symptom had quite disappeared, and never returned. This occurrence rather puzzled me as a result of the painting with iron, and I was naturally disposed to refer the pain to gouty kidney. But a day or two after my patient told me he remembered to have had a precisely similar attack when at 20 years of age he was wrecked on an island in the China seas, robbed of his clothes, and compelled to accept such garments as the natives offered him. In consequence, as he supposed, of wearing this clothing he acquired an eruption round the waist which he styled "itch" (but which may probably have been Herpes zoster). On reaching Singapore a surgeon whom he consulted painted the eruption with tincture of iron, and thereupon he was seized with violent strangury which lasted a day or two. The coincidence, as it appears to me, proves that this agent may be classed among those which can induce strangury in certain persons-though, perhaps, in those only who have a tendency to gout.

Clinic of the Month.

Surgical Treatment of Aneurysm.—The conclusions given by Mr. Holmes as to the treatment of popliteal aneurysm, to which present treatment points, are as follows:—1. Rapidly growing aneurysms, with a thin or imperfect sac, are best treated by immediate ligature, especially when caused by recent violence; and the success of compression is doubtful in aneurysms growing towards the knee-joint, and in all others which advance rapidly. 2. The Hunterian ligature has been about twice as successful in modern hospital practice in this country as the results of the accepted statistics show it to have been. 3. The results of the compression treatment in the same hospital have given as yet about the same average results as those of the ligature, but these results might be much improved by a more careful employment of the method. 4. Too long persistence in compression is to be deprecated as being likely to interfere with the success of the ligature. 5. Flexion is often successful when used so as not to distress the patient, and is worthy of a trial in all cases in which it stops or materially checks the pulsation, but should not be long persisted in when it is not at once beneficial. 6. We have no evidence showing the utility of, or the need for, the less usual forms of treatment, such as galvanism, coagulating injections, manipulations, temporary ligature, or the introduction of foreign bodies. (British Med. Journal, Aug. 8, 1874.)

On Excision of Cancer of the Breast by Scissor-cutting under Ether Spray.—Dr. B. W. Richardson, after reporting in detail two cases of operation of this nature, proceeds to make the following comments:—The effects of the local Anæsthesia.—It is certain that in both the cases the local method afforded everything that could be desired in the way of anæsthesia. It saved all acute pain; it saved the patient the dread of death during the insensibility from a general anæsthetic, and it enabled Dr. Richardson to proceed in his task without a thought as to the immediate safety of his patient. It even warranted him in

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Richardson to make a case of instruments for the special purpose of operation on the method under consideration. Effect of the operation on the Heart in the cases related.—No fact is more instructive in the history of the patients recorded in this paper than the beneficial effect produced on the functions of the heart by the operation. In both instances the cardiac irregularity and irritability were partly due to irregular nervous supply—to nervous irritation and consequent muscular exhaustion. The irritation might have been due, in part, to the mental anxiety which naturally accompanies the disease, or it might have been due to the irritation of the tumour, and have been reflex in Whichever view be correct, the result of the operacharacter. tion was curative, and, as the cases are typical of a class of phenomena of disease, the lesson they teach is extended far beyond them as individual illustrations. They show that so soon as the heart obtains rest from the persistent nervous thrill that invades it, its muscular tone returns, and its irregular motion and excitability cease. Thus, by operating early for the removal of cancer, the surgeon acts as physician also, and prolongs the general life by removing the local disease. Patients suffering from cancer have been seen to die from the mental and local irritation of the disease long before any development of the malady has advanced to kill by destruction of the part or organ involved. It may therefore be inferred, that if, without any danger to life from general anæsthesia, we can remove external malignant growths painlessly and promptly, so soon indeed as they are detected, we shall bring art effectively, to the defeat even of cancer. (Lancet, August 29, 1874).

Post-partum Hæmorrhage treated by the injection of Perchloride of Iron.—Mr. Swain, of Devonport, reports two cases in which this plan of treatment was successfully adopted. In one of them, the patient being apparently healthy, a little chloroform was given, and she was delivered of twins. The placenta was single and of enormous size; considerable hæmorrhage occurred at the moment the placenta was expelled, and a binder was put on. Within a few minutes obvious intra-uterine hæmorrhage had taken place. Pressure, kneading, brandy, ice, and ergot were injected, but the flow of blood continued until the perchloride of iron was injected on Dr. Barnes' plan, which caused immediate and permanent arrest. In the second case, the woman, a multipara, had been in labour sixty hours. Forceps were then applied and the child extracted alive; but soon hæmorrhage set in with great violence. Feeling that another gush might be fatal, Mr. Swain injected the perchloride, and again with immediate and happy result. (British Med. Journal, Sept. 5, 1874.)

The alleged dangers of Dentition and the practice of Lancing the Gums.—Dr. Finlayson, of Glasgow, after pointing out the extreme differences of opinion that exist in regard to the relations between the process of teething and infantile disease —one party thinking them closely connected with almost all the diseases of childhood, whilst another believe that it is almost entirely unconnected with them-remarks that the opinion, one way or the other, must make a great difference in the diagnosis and in the treatment adopted; the one regarding the lancing of the gums as a universal panacea, the other believing it to be wholly Many processes are, however, taking place in the child simultaneously with dentition; and various physicians have ascribed to other conditions the maladies that beset infancy. Billard refers the attacks of diarrhea, so common in childhood during the teething period, to the development of the intestinal follicle and of the other parts of the digestive system occurring at this epoch. Billard likewise points out that important changes take place in the brain of the child during the first year of its existence; and he maintains that the frequency of cerebral affections at that age ought to be attributed to these changes. Dr. Finlayson refers to Armstrong's, Billard's, and Norton's views on the ctiology of infantile diseases, in order that too much importance may not be attributed to dentition, and that it may be borne in mind that other causes should be carefully investigated before referring a given illness to a physiological process. introduction of the practice of lancing the gums may be ascribed to Ambrose Paré; but though there are several remarkable cases on record, incision does not seem always to have been followed by precisely the appearance of the tooth, or by the cessation of the symptoms to be relieved. The wound in the gum healed up, and a great question was raised whether the scar did not hinder the subsequent progress of the tooth. This fear was alleged to be founded on ignorance, since all parts which had been the seat of wounds or sores are always more ready to give way to pressure. This reply was, however, met by the assertion that while new cicatrices easily break down old ones do not, and that real trouble had been experienced from this cause. The controversy as to the cicatrix is closely related to another question, viz., at what stage of dentition may the operation be performed with advantage, and how often should it be repeated. And in reviewing the methods adopted, there can be no doubt that some practitioners operated far too early and too frequently? The tendency of opinion at present, Dr. Finlayson thinks, seems to assent to Dr. West's dictum, that the circumstances in which the use of the gum-lancet is really indicated are comparatively few; and he regards as the chief danger of the wholesale use of the gum-lancet, that it embodies in practice a theoretical view

of the ailment, and so tends to close the mind against further inquiry into the diagnosis, etiology, and treatment of infantile disorders. (*British Med. Journal*, Sept. 19, 1874.)

Treatment of Acute and Chronic Bronchitis and Asthma. —Dr. Spurgin, of York, states that he has tried iodide of potassium in over a hundred cases with almost invariable success: in fact with such success that patients have expressed themselves by saying, "It has acted like a charm." Others have said that no medicine ever had any real effect upon their complaint before. Iodide of potassium has a marked effect upon the breathing, reducing the frequency of the respirations; perhaps also, he thinks, overcoming spasms. Almost after the first dose patients have stated they have felt the medicine touch their complaint. Dr. Spurgin usually prescribes it with carbonate of ammonia, and when the cough is very troublesome adds tincture of belladonna and ipecacuanha wine. In one very bad case of broncho-pneumonia he tried iodide of potassium with tincture of hyoscyamus and ammonia, and the respirations were quickly and astonishingly reduced from forty in a minute to less than half that number. He adds that he has purposely given a mixture containing ammonia, belladonna, ipecacuanha wine, spirit of sulphuric ether, &c., without iodide of potassium, and has not found much benefit result from their use. After this he has added the iodide of potassium, and found the patient relieved almost at once. (Ibid, Sept. 5, 1874.)

Successful treatment of a Case of Tetanus.—Dr. J. B. Carruthers, of Edinburgh, records the case of a lad of 14 years of age, always previously healthy, who in the first week in April bruised his little finger with an iron railing. The finger healed satisfactorily, the nail coming away afterwards. On the 18th of April his shoulders were bruised by the nailed boots of another boy, who mounted upon them in order to climb a wall, and the next day he received a kick in the back. On the 24th he was feverish, with pain in scapular regions; and on the 26th he was seized with tetanic symptoms, rigidity of the muscles of the whole body, and acute pain over the entire length of the spinal column, the least pressure bringing on opisthotonos. Dr. Keith was called in consultation: twenty minims of nepenthe were injected into the back, a dozen leeches applied, and ten grains of chloral given every three hours. The same day Dr. Warburton Begbie also saw the patient. The pain was relieved by the above treatment; but the boy was restless, pulse 130, temperature 102°.2, jaw closed, muscles of abdomen and legs very rigid, face livid, skin warm and profusely perspiring. The case was regarded by all as very serious. The treatment

was now restricted to 10 grains of chloral hydrate and twenty grains of bromide of potassium every three hours. During the next two days, April 27th and 28th, the medicine was given every two hours. He swallowed milk pretty well, and got four hours' sleep. A slip of belladonna plaster was applied over the whole length of the spine. An enema of castor oil was given, which acted well, and led to a sleep of four hours' duration. After this period, up to the 8th of May, occasional paroxysms occurred; but on the whole steady improvement took place, and on the 25th of May he was convalescent. In the notes on the case, Dr. Carruthers remarks on the large quantities of chloral taken, amounting to no less than 1,140 grains in 16 days (71 grains per diem). All kinds of delusions of the boy's mind ensued. (Lancet, Sept. 26.)

Extracts from British and Foreign Journals.

Treatment of Gonorrhæa.—At a late meeting of the Société de Médecine de Rouen, M. Bedoin, surgeon to the 3rd Hussars, observed that cubebs and copaiba entered into the composition of most of the remedies employed for the relief of blennorrhagia. In many instances they prove useless, and M. Bedoin does not believe they merit the favour in which they are held. Having had charge of a large number of cases, he has adopted a special plan, the principal features of which are as follows:—As soon as the inflammatory period has passed he gives to his patients four or six injections per diem of the solution, composed of crystallised sulphate of zinc, 20 parts; crystallised subacetate of lead, 20 parts; distilled water, 1,000 parts; the mixture being well shaken each time it is used. As the discharge diminishes the number of injections is gradually reduced to one a day, till not the slightest oozing takes place from the urethra. Towards the end of the attack a little wine is given, and the quantity of this is gradually increased till the disease is cured. Owing to double decomposition, the fluid contains sulphate of lead in suspension and acetate of zinc in solution, which last has a powerfully astringent action. Of seventy-two cases thus treated, only thirteen failed to be cured. In the discussion which followed, M. Bouteiller gave the formula for an injection very successfully employed by M. Vidal de Cassis, namely: Rose-water, 250-300 parts; subacetate of lead, to 1 part; sulphate of zinc, to 1 part; laudanum, 4 parts. Two injections per diem. M. Bouteiller himself, however, frequently prescribed the acetate of zinc. M. Grout found injections containing the nitrate of bismuth very advantageous. (La France Médicale, June 1873.)

Action of Spartein upon the Animal System.—Prof. Fick, in an article contained in the Archiv f. Exper. Pathologic und Pharmacologie, Band 1, p. 397, gives an account of a careful investigation he has made into the action of the alkaloid spartein first discovered by Stenhouse. He has arrived at the conclusion that it should be classed with the narcotics, though its action on the brain is not very intense. In mammals, a dose of 0.05 to 0.07 of a gramme causes a transitory elevation of the frequency

of the pulse and respiration, sleepiness, and heaviness; larger doses of 0:15 to 0:2 of a gramme threw the animal into a The frequency of respiration is augmented to double its ordinary amount, whilst the cardiac contractions increase only to a small extent, becoming at the same time considerably enfeebled. After some time the respiration becomes irregular, with marked dyspnœa, and death occurs with general convulsions, probably due to paralysis of the respiratory centre. Death can be postponed for a considerable period by the maintenance of artificial respiration. After poisoning with spartein, as with atropine, arrest of the action of the heart no longer occurs on irritation of the vagus, irritation of the sinus, or poisoning by muscarin. Its paralysing influence on the vagus is imperceptible with a dose, and, in a period of time when the bibitory centre itself still remains unaffected, spartein paralyses the spinal cord and the motor nerves. (Centralblatt, 1874, p. 445.)

Modifications of Coloration in Syphilitic Eruptions during Pregnancy.—Under the influence of syphilis, during the course of pregnancy, we sometimes see a special pigmentation of certain parts of the integuments. The spots produced by this pigmentation have received the name of ephelides. Mr. Hardy classes amongst the syphilides the pigmentary spots which in the subjects of venereal diseases affect certain parts, and has given to them the name of pigmentary syphilides. All dermatologists are not in accord with him in regard to this innovation, seeing that the syphilitic pigmentation, which is a phenomenon appearing intermediately between the first and second periods of syphilis, never yields to specific treatment. The pigmentation in question may be comprised in the same group of syphilitic affections as vegetations which often occur in syphilis; both showing themselves rebellious to mercurial Pigmentary syphilis is a special form which must not be confounded with the spots or maculæ which succeed to almost all syphilitic eruptions. This syphilide appears alone or conjointly with other modifications of the secondary or intermediate period; it is characterised by spots, not in general well marked, of yellowish or greyish colour, and separated by plaques, the whiteness of which contrasts with the ordinary colour of the integument. The spots do not project from the surface of the skin, and they usually appear upon the neck or chest, or the internal surface of the arms, but they are rare elsewhere. Under the influence of pregnancy the spots undergo remarkable They augment in size, and become so intensified alterations. in colour that they resemble the dark shade seen around the areola in pregnancy in brunettes. Their duration is from five

to six weeks. Under the microscope no vegetable parasite is discernible. (La France Médicale, May.)

Effect of Warmth in preventing Death from Chloral. -Dr. Brunton, in experiments with chloral, confirms the observations of Liebreich and others, and finds that the subcutaneous injection of a solution of chloral induces sleep, which is light and easily broken if the dose be small, but passes into coma if the dose be large. In dogs, considerable restlessness was observed before sleep came on, and the respiration was at first rendered rapid, but subsequently became slow. A remarkable diminution of temperature was observed, which appears to be partly due to greater loss from the surface, caused by the vessels of the skin becoming much dilated under the influence of the drug. and allowing the blood to be cooled more readily by a low external temperature. It is partly due also to the diminished production of heat which cessation of muscular action always induces. Dr. Brunton found that an animal wrapped in cottonwool may recover perfectly from a dose of chloral which is sufficient to kill it when exposed to the cooling action of the air, and that recovery from the narcotic action is much quicker when the temperature is maintained in this way, and still more rapid when the animal is placed in a warm bath, providing this is not excessive. The bearing of these experiments on the treatment of persons suffering from an overdose of chloral is obvious. The patient should be put to bed, and the temperature of the body maintained by warm blankets and hot-water bottles to various parts of the body, and especially to the cardiac Warmth over the heart is an excellent stimulant to the circulation, which, like the respiration, is enfeebled by chloral. If respiration threatens to fail, it should be maintained artificially so as to allow time for the chloral to be excreted and the normal functions to be restored. (Humphry and Turner's Journal of Anatomy, No. 14, May 1874.)

The Physiological Action of the Preparations of Bromine.—Dr. Steinauer considers that the experiments hitherto made to determine the question whether in the preparations of bromine the bromine exerts a specific action are insufficient, because in them the difference in the action of potassium and sodium-bromide has alone been considered, and no attention has been paid to compare the action of these bodies with other combinations of the same metals. In Steinauer's researches, instead of the salts of potassium and sodium, he used hydrobromic acid (bromic anhydride), bromated acetic acid, especially

monobromo-acetic acid $\left\{\begin{array}{c} \mathrm{CH_2Br} \\ | \\ \mathrm{COO\,H} \end{array}\right\}$, the bibromised acetic acid

being less adapted on account of easy destructibility. Bromobenzol and bromo-benzoic acid, hydrobromic acid, and the bromated acetic acid (as well as the salts of the latter) proved themselves to be poisonous. In doses of from seven to fifteen grains they proved fatal to rabbits in half an hour. Hydrobromic acid, in the course of a few minutes, produced distinct effects on the heart and respiration. At first the frequency of the pulse fell to some extent, whilst the respiration increased in frequency, and the animals at the same time became more quiet. After a little while voluntary power was lost, and soon after there was diminution, and ultimately complete loss of reflex activity. Then ensued irregularity in the respiration and cardiac beats; still later, remarkable diminution of both, and death, preceded, in warm-blooded animals, by con-Post-mortem examination showed arrest of the vulsions. heart's action in diastole; and neither mechanical nor electrical excitation, directly applied, called forth more than a few and slight contractions. The sequence of symptoms in poisoning with the monobromised acetic acid was very similar, except that the heart was arrested in systole; artificial respiration proved useless, and in no respect altered the course of the symptoms. Neither section of the vagus nor paralysis of the terminal branch of the cardiac nerves by nicotine, prevented the fall of the pulse in frequency, and Steinauer hence concluded that the vagi are not acted on by this poison; and from the results of a series of other experiments he is inclined to admit that it causes paralysis of the cardiac muscle with coincident affection of the excito-motor cardiac centre. Monobrombenzol and monobrom-benzoic acid, in both of which the bromin is strongly combined with the other molecules, exhibited a mode of action that differed little from the above. (Centralblatt für der Medicinisch Wissenschaften, No. 26, 1874)

The Decomposition of Potassium.—Iodide in the Organism.—In a careful discussion upon the therapeutic action of potassium bromide, C. Binz mentions the observation of Schönbein, to which, on the whole, but little attention has been paid, to the effect that acidified potassium iodide is immediately decomposed by vegetable infusions containing protoplasm. Binz adapts to this experiment the relations of the animal body, by replacing the mineral acids with a current of carbonic acid. The addition of quite neutral protoplasm immediately sets free iodine; upon this fact he founds an hypothesis upon the still completely obscure action of the completely neutral potassium iodide on the human organism. Like the protoplasm of the cells of plants, the protoplasm of the cells of warm-blooded animals, which, with Schultze and

Kühne, he considers to be identical with that of plants, is capable, he maintains, of effecting the decomposition of potassium iodide under the influence of carbonic acid. Certain specific tumours are most amenable to the action of potassium iodide, and this is due to the fact that their cells can set iodide free, and a change in their chemical and histological characters is the necessary consequence. (Buchner's Repert. f. Pharmacie, Band xxiii. sect. 8.)

Lachrymal Fistula cured by the Injection of Tincture of Iodine.—Dr. Del Toro states that a woman, aged 22, had three months previously had an abscess at the inner angle of the right eye. The result was a fistula leading into the lachrymal sac. As a means of cure, he injected the tincture of iodine with an Anel's syringe. Sharp inflammation of the sac followed, which extended to the conjunctiva, but effected a cure in the course of four or five days. Dr. Del Toro remarks that the existence of conjunctivitis limited to one eye ought always to lead to the suspicion that a fistula of the lachrymal sac is present or likely to form. (Cronica Ophtalmologica de Cadix and Echo de la Presse Médicale, July 1874.)

Action of Cantharides.—At a recent meeting of the Société de Biologie (July 18, 1874) M. Gallippe gave an account of his researches on cantharides. He has experimented with the tincture of cantharides and with cantharidine, and finds that the tincture of cantharides administered in large doses, as from 100 to 200 grammes, causes dilatation of the pupil, bloody vomiting, and a state of comatose drunkenness. Post-mortem examination shows catarrhal inflammation and ulcerations of the stomach and intestines, and he has satisfied himself that it has an undoubted aphrodisiac action. He experimented in different ways with cantharidine, as by intravenous injections, by subcutaneous injection, and by ingestion into the stomach. The intravenous injections were made with doses varying from $\frac{1}{5000}$ to $\frac{1}{500}$ of a gramme, olive oil being used as a vehicle. He has observed the signs of endopericarditis, pleural effusion, pulmonary congestion, and symptoms of intestinal irritation. Cantharides has also in dogs an aphrodisiac action. (Le Progrès Médical, July **25**, 1874.)

Treatment of Gout and Uric Acid Deposits by the Ferruginous Benzoate of Lithia.—Various works recently published have spoken in high terms of the use of benzoate of lithia in cases of gout and uric acid urine, and MM. Dalkiewicz and Mallez have recommended its use combined with ferruginous preparations. This is an instance of rational therapeutics, for benzoic acid in passing through the body undergoes conver-

sion into hippuric acid at the expense of the proteic substances, which are the principal source of uric acid. Hippuric acid forms with the ordinary bases of the body—as soda, potash, and ammonia—salts possessing a high degree of solubility, whilst the urates of these same salts are insoluble in the liquids of the economy, and form almost exclusively the gravel of the urine and the tophi of the joints. M. Gubler has hence given, in his "Commentaires du Codex Medicamentarius," the preference to the use of the benzoic acid. But this acid cannot be employed per se for a long time, as is shown by the experiments made in the Paris hospitals. M. Tréhyou has therefore thought it advisable to associate lithia with the benzoic acid, producing a very soluble salt, which prevents the fresh formation of uric acid and forms with that which exists a urate of lithia, which is the most soluble of all the urates. Like all the alkaline preparations, however, this, if continued too long, has its inconveniences, and M. Tréhyou has had the excellent idea of adding iron to Experience has shown that he has not been mistaken, various writers having published statements showing the advantages they have seen follow the use of the compound preparation. (Ibid.)

Treatment of Varicose Ulcers by the Hypochlorites.— Dr. Panas observes that a local asphyxia caused by congestion of the part with stagnant venous blood is the essential feature of varicose ulcers of the leg. The removal of the asphyxiated condition will greatly aid in the process of recovery, and the best mode of effecting it is by the local oxidation of the stagnating blood, by which means the ulcer is converted into an ordinary granulating surface. Demarquay showed some years ago that in oxygen baths, wounds, the skin, and the limbs generally quickly lost any cyanotic appearance that might be Panas refers to such a process of oxygenation the very favourable action he has observed to take place in cases of ulcer of the leg when hypochlorites were used as applications. and especially the hypochlorite of lime. When these salts come into contact with the secretions of wounds, a decomposition takes place leading to the evolution of free oxygen, which is rendered still more active since it is in statu nascendi. chlorine eliminated at the same time he does not believe to have any favourable action, since he finds that no benefit accrues in these affections from the application of chlorine water. (Centralblatt für Chirurgie, No. 14, 1874.)

Laparotomy for Intussusception.—The term laparotomy ($\Lambda a \pi a \rho a$, the soft part of the body below the ribs, and $\tau \epsilon \mu \nu \omega$, to cut) is proposed by Dr. Ashhurst, of the Episcopal Hospital, Philadelphia, as superior to the terms gastrotomy, enterotomy,

and colotomy, to indicate an exploratory operation undertaken for the relief of intussusception, and which may or may not involve an incision into the bowels. In his work on the "Principles and Practice of Surgery," published in 1871, he expressed himself unfavourable in regard to it; but the record by Mr. Jon. Hutchinson of a successful case has led him to reconsider the subject, and though still thinking it can only be properly resorted to in very exceptional cases, he does not now regard it as unjustifiable. Dr. Ashhurst has collected a series of thirteen cases, in five of which the patient recovered from the operation. An inspection of the table shows, first, that no encouragement is afforded to repeat the operation on very young infants, as the only cases in which it has been resorted to during the first year of life have all terminated fatally. Secondly, in what may be called acute cases, in which, in addition to the symptoms of obstruction, there are evidences of strangulation. such as peritonitis and intestinal hæmorrhage, a resort to operative interference will be productive of no benefit. There remains a limited number of cases in which the symptoms are those of obstruction without intestinal hæmorrhage or peritonitis, in which, when other measures have failed to give relief, the question of operation may properly be considered. Dr. Ashhurst also gives the results of fifty-seven cases of laparotomy undertaken for other causes than obstruction. Of these, eighteen terminated successfully. (American Journal of Medical Science, July 1874.)

Experimental Essay on the action of Alcohol in Fever.—Dr. Strassburg, of Bremen, gives the results of some observations he made whilst in attendance on a garrison hospital, and finds, with Binz, that alcohol for the most part lowers the temperature of the body. He is, however, by no means disposed to believe that alcohol acts thus in all cases. It is necessary that the quantity given should always be stated, since, on account of the rapid destruction of alcohol in fever, a quick tolerance for a large amount of it is established. and it must not be then expected that a few centimetres will produce any effect. He calls attention to the advisability of not using indifferently fermented wines, or wines containing unwholesome products, and recommends instead that the absolute alcohol of the German Pharmacopæia should be prescribed in definite quantities, to which a sufficient quantity of water may be added, and the whole flavoured with lime-juice and diluted with sugar. (Pamphlet, and Virchow's Archiv, Band 60.)

The Excretion of Carbonic Acid after Injection of Quinine.—In another pamphlet we have received from Dr. Strassburg, he gives results he has obtained from the adminis-

tration of quinine to rabbits both in health and in febrile conditions, and he finds that (1) Quinine in healthy rabbits in moderate doses, which distinctly lowered the temperature, no diminution in the absolute amount of carbonic acid exhaled took place; (2) Quinine given to rabbits in a febrile state caused a diminution in the amount of carbonic acid eliminated, though not to so great an extent as occurred in control experiments in which tracheotomy was performed. (Archiv f. Experiment Pharmakologie, ii. 334.)

Treatment of Prolapse of the Umbilical Cord.—Dr. G. J. Engelmann observes that there are cases of prolapse in which it is not desirable to leave the progress of the labour wholly to the powers of nature—cases in which interference is necessary yet no indications for operation exist. Now, the first and most simple assistance that can be rendered is to properly direct the patient's voluntary efforts; either, as the state of the case demands, keeping her quietly in one position, refraining from pressure with the abdominal muscles, or, when labour is far advanced, to encourage her to aid the passage of the head by the exertion of all her energies. 1. Postural treatment.— Equally simple, and on that account neglected probably in clinical teaching as well as in the text-books, is the treatment by position, which is a valuable aid to the practitioner. It consists in placing the patient on the side opposite to that on which the funis has prolapsed, so that the cord may be relieved from pressure, when it may perhaps glide back into the cavity of the womb. When the prolapse takes place in one or the other of the sacro-iliac fossæ, the patient should be placed on her hands and knees in the knee-elbow position. This position, however, is unfortunately very tiresome, and if too fatiguing, the patient must be placed in the corresponding side position, on the left side if the cord has prolapsed into the right sacroiliac fossa. Dr. Engelmann has achieved good results by this method. Position alone, as Thomas some time ago remarked, will rarely if ever cause the return of the cord without the aid of manipulation, unless the bag of water is unbroken; and even then it may not. 2. Reposition of the cord.—The carrying back of the prolapsed loop into the cavity of the womb beyond the presenting part is a treatment that has been given up as ineffective by some, whilst it is most warmly recommended by others. In Engelmann's cases reposition was accomplished in only seven of the eleven cases in which it was attempted; and though apparently successful in these seven cases, the cord not reappearing, only four of the children were saved. In the out-door department the results were but little better, reposition of the prolapsed loop having been practised in thirty-two cases, and, notwithstanding that the operation seemed to have succeeded in twenty-six of these, not more than sixteen children were saved—in fact, by reposition of the cord alone only thirteen, as delivery was hastened by operation in three other The life of the child was saved in fifty per cent. of the cases in which reposition was apparently successful, and in forty per cent. of all the cases in which it was attempted; and as it was only resorted to in the more favourable cases, with wellpulsating cord and normal pelvis, the plan does not seem to afford much encouragement. Reposi on is justifiable in many cases, but it has its strictly defined indications. With few exceptions, it must be confined to cases of prolapse with head presentations, as it is only with the sounded and resistant head that, when the loop has been carried back beyond its greatest circumference, the uterus can by its contraction prevent the immediate return of the prolapse. Not unfrequently a life is lost by too obstinate adherence to this method of treatment, the continued pressure and traction required proving fatal to the child: and in the same way, even when apparently successful, pressure at a higher point may have arrested the circulation in it. It should only be undertaken when the os is so far dilated that the escape of the waters is no longer to be feared, that, in case of necessity, delivery by forceps or turning can be immediately resorted to. The best instrument for the purpose of reposition is Robertson's funis replacer, and when apparently accomplished the feetal heart must be closely observed, as it is by this means alone that it can be ascertained that it has been really effected; the feetal pulse becoming strong and regular, continuing so after several pains. 3. Anæsthesia.—The use of chloroform was frequently resorted to, and proved a valuable adjuvant in achieving reposition of the cord. 4. Forceps.—The forceps were resorted to about as often as the reposition of the In fifteen of the thirty cases in which it was applied the child was saved. 5. Extraction by the feet.—Extraction by the feet, simply not following version, was practised in sixty-five cases, in forty-seven of which (72.3 per cent.) a living child was developed. The success naturally depends upon the favourable prognosis offered by breech-first labours, in which alone it can be resorted to, and the treatment is mainly a postural one. Extraction by the feet was practised in fourteen of the lying-in house cases, and in only one was the child delivered dead. putrid—a case which should justly be excluded. were less favourable in the out-door cases, the accoucheur not unfrequently being called in too late. The patient should be so placed that a return of the presenting loop may be facilitated, all muscular strain must be avoided, the membranes must, if at all possible, be preserved intact until the os is sufficiently

dilated, and when this is the case, the parts being yielding, we must not wait for threatened signs on the part of the feetal pulse, but at once deliver by version. The operation which was most frequently resorted to and which proved, comparatively speaking, most successful, was turning by the feet, immediately followed by extraction. Of the 125 cases so operated on, seventy-two were favourable, 57.6 per cent. of the children were saved; and this result holds good not only for transverse and shoulder presentations, but also for head presentations. 7. Cephalotrify.—Craniotomy can certainly not be classed among the operations called for by prolapse of the funis, yet Engelmann makes mention of this operation, as it was so often necessitated for the preservation of the mother, and as the large number of these operations, twenty-five amongst 365 deliveries, complicated with prolapse of the cord, most forcibly proves the frequency of the highly contracted and the distorted pelvis as cause of the prolapse. (American Journal of Obstetrics, August 1874.)

Treatment of Fractures of the Femur by Immovable Apparatus, especially by Plaster of Paris in the form of a Continuous Roller.—A paper with this heading appears in the New York Medical Journal from the pen of Dr. F. H. Hamilton, of Bellevue Hospital Medical College. The apparatus immobile, in one form or another, dates from a very early period: but M. Seutin first secured for it the general confidence of the profession, when, in 1834, he published the results of his experience with starch bandages. In 1837 M. Velpeau substituted dextrine for starch; and still later, surgeons learned to use simple flour paste. In 1852, Mathiesen, a Dutch surgeon, suggested plaster of Paris, to be employed in the form of a continuous roller. Pretty frequent and sometimes serious accidents resulted from the use of these plans, such as gangrene, ulceration, delayed union, and deformity; yet, as applied by Pirogoff, Hunt, Gamgee, and others, signal success was obtained in a large Professor Sands, of New York, records number of cases. twenty-one cases of fracture of the femur treated by Mathiesen's method, in eight of which there was no shortening, whilst the maximum shortening did not exceed one inch. Dr. Bryant, of Bellevue, published twenty-three cases, of which thirteen are not shortened. H. St. Johns has recorded fifty cases, with an average shortening of one-third of an inch; and of the whole number, eighteen united without any shortening. None of these gentlemen have met with any serious accidents, except that in one case a perineal slough was observed. Dr. Hamilton observes that he has no doubt those who delay the application of the plaster five or six days, or until after the subsidence of the first acute swelling, avoid, to a great extent, the danger of

gangrene, yet not entirely; but Dr. Sands insists upon the safety of early or immediate applications, and attributes, in a great measure, the remarkable results to this practice. Dr. Sands also considers the perinæum the point upon which the surgeon is to depend for the counter extension. Few however will, we think, assent to this doctrine. The top of the foot and the heel are actually the parts alone to be trusted for the extension. In regard to readjustment, it is often recommended that when the plaster becomes loose it can be cut open and tightened. Experience has shown that this will not do. The mould is thereby too much weakened to give the proper support when the patient is up; and in folding it in, it is found not to fit well. The practice almost uniformly pursued at Bellevue is, therefore, either to permit it to remain loose or to take it off entirely, and placing the patient under ether, with the aid of pulleys to dress it again in the same manner as at first. Dr. Hamilton agrees with Billroth in thinking that delayed union and non-union occur more frequently under the plaster treatment than under any other. Objections of minor importance to the plaster of Paris method is the amount of skill that is required to apply the bandage well, and the exposure, in the case of women, of one-half of the body for from one to ten hours. Dr. Hamilton concludes his paper by remarking that whilst he recognises the convenience and utility of the plaster of Paris and of other immovable forms of dressings in the treatment of certain fractures, it has not proved satisfactory under his observation when applied in the treatment of fractures of the femur, and especially when applied immediately after the occurrence of the fracturehis own method of treating these fractures without perineal bands, with side-splints, adhesive plaster, extension pulley and weight, having given better results (without any accident) in the adult. In the case of children, his double thigh-splint has also given better results than has plaster of Paris. These methods are far in advance of the double-inclined planes, and of Desault's, Boyer's, Hagedorn's, Gibson's, and other long splints. They avoid all danger of ligation and strangulation of structures; there is no perineal band to cause ulceration; extension is made by a method which equally—when properly applied—shows the danger of ulceration about the heel, an accident so common with the old garter; the patients are comfortable; the limbs are seldom united with any deformity; and the average shortening is less than with any other method yet devised. (New York Medical Journal, Aug. 1874.)

Treatment of Shingles.—After exhausting all the methods advised for the treatment of shingles, and especially the atrocious pains which attend this disease, Dr. Bourdon adopted

the following:—A layer of collodion, containing hydrochlorate of morphia, in the proportion of 30 grammes of the former to 50 centigrammes of the latter, was applied to the diseased parts without opening the vesicles. The pain ceased on the second day; and after seven or eight days, when the collodion fell off, the vesicles had entirely disappeared, and only a slight redness was apparent. (Gaz. Med. Ital. Prov. Venete, No. 3, 1874.)

Digitalis in Puerperal Cases.—Dr. Winkel, who has made various experiments with the different preparations of digitalis, does not hold it to be a specific in puerperal fever, but administers it as a prophylactic against the phlegmonous process. When disturbance of the digestion results, he discontinues its use. Dr. Winkel found the hypodermic use of digitalin, dissolved in equal parts of alcohol and water, in the proportion of .001 gramme of digitalin in 3 grammes of fluid, to be the best method of administration. The mean requisite dose is 005 grammes. The advantage of this preparation is found in the smallness of the dose and the ease with which its action may be regulated. The effect follows in one to three days generally, a simultaneous sinking of the temperature and pulse being observable. Elimination cannot be absolutely stated to take place through any Digitalin appears to act upon the brain—producing rest, better sleep, and enlargement of the pupil. It appears also to act as a styptic, recommending itself in this respect after severe hæmorrhage. The question as to the tolerance by puerperal women of large doses cannot as yet be answered, the assertion of its only partial absorption through the altered condition of the intestine being unsupported by proof. The favourable action of digitalis is attributed by Dr. Winkel to its effect upon the circulation; for, as in the chills of the puerperal condition the prognosis is more favourable when the pulse is not over 100, it is evident that a remedy which will prevent such increase must be beneficial. The observation of after-pains following the continued use of digitalis, together with its styptic action, has given rise to the conjecture that its effect is upon the unstriped muscular fibres of the uterus. By its contraction of the capillaries it prevents exudation of the colourless bloodcorpuscles. (New Remedies, July 1874.)

The Mode of Action of some Emetics.—M. Chouppe presented to the meeting of the Société de Biologie on June 27, 1874, a paper on this subject, in which he stated that in the opinion of some authors, emetics, when introduced into the general circulation, only produce their action at the moment of their elimination. They come into contact at this time with the peripheric extremities of the pneumogastric nerves, and the excitation of these leads to the reflex act which produces vomiting.

In the opinion of others it is not necessary that the active agent should excite the mucous membrane of the digestive organs, but it is requisite only that a sufficient quantity should be in contact with the medulla oblongata, in which it can excite the nucleus of origin of the vagus. After making a large number of experiments in M. Vulpian's laboratory, M. Chouppe has satisfied himself that each of these two opinions is true in certain cases, false in others. He believes that in regard to their mode of action there are well-marked differences between the different emetics. He has hitherto studied the three emetics chiefly employed apomorphine, ipecacuanha and its alkaloid emetine, and tartar emetic. In the first series of his experiments he divided the two pneumogastrics in a dog, which was then allowed to rest till the vomiting provoked by the operation had entirely ceased. He then made a subcutaneous or intravenous injection of an emetic dose of the solution of the substance the action of which he was desirous of investigating. With apomorphine, and with tartar emetic, vomiting occurred as quickly and as freely in all instances as when the nerves were intact; whilst with ipecacuanha, on the contrary, vomiting never occurred. In a second series of experiments, after the section of the nerves, emetine was introduced subcutaneously, and after waiting some time to see if vomiting occurred, which it did not, a solution of tartar emetic or of apomorphine was injected, when vomiting speedily followed. An important point noted was that ipecacuanha acts much more freely and quickly when it is introduced into the stomach than when it is injected subcutaneously, whilst exactly the opposite occurs with the two other drugs. It seems from this that tartar emetic and apomorphine act both on the central nervous system and the gastric mucous membrane, whilst emetine seems to have an exclusive action on the peripheric extremities of the nervus vagus. (Gazette Médicale de Paris, Aug. 1, 1874.)

The Causes of Goitre.—Dr. J. B. Wilson, surgeon to the 11th Hussars, having had unusual opportunities of studying goitre and cretinism at Bhagsoo, Dhurmsala, a hill station of the Punjab, for British troops, determined to turn them to account by endeavouring to ascertain whether the connection stated to exist between the water and the disease was present in this instance. He gives analyses of no fewer than 100 cases of goitre, taken indiscriminately from amongst natives residing within a radius of ten miles, in regard to their occupation; average pulsations per minute; time of life when the disease made its appearance; and the hereditary transmission of the disease. Careful examination and analysis of the water showed only a small amount of lime, and there was no reaction produced when testing for organic matter. It did not appear, therefore, that

the disease could be produced in this case by excess of lime in the water. Dr. Wilson thinks there is strong evidence in favour of the theory that ordinary, like exophthalmic goitre, is entirely a circulatory disease, and that its tendency to occur is encouraged and in some cases induced by active occupation, especially when the constitution is in a reduced state; by the effects of elevation from the sea-level upon the circulation; and by the increased frequency of the circulation invariably noticed in the subjects of this disease. The fact that the periods of life when this disease most frequently occurs are those when the circulatory powers are in their greatest activity, is not, he thinks, of trivial import in support of the theory here submitted as the primary cause. (Pamphlet, 1874.)

Therapeutic Applications of Electricity.—At the annual meeting of the American Medical Association, held at Detroit on Tuesday, June 2nd, Dr. Beard of New York delivered an address upon some of the therapeutic applications of electricity, and the following were his conclusions:—

1. That certain benign tumours, as goitres, enlarged glands, and cysts, can be made to diminish or disappear under electrolysis.

2. That fatty tumours and enlarged lymphatic glands are usually very difficult to diminish by electrolysis, and sometimes they will not diminish at all.

3. That malignant tumours will not usually diminish, and rarely, if ever, entirely disappear under electrolysis, but the pains connected with them can be treated most successfully by electrolysis.

4. That malignant tumours, when sufficiently accessible and not too far advanced, may be treated by electrolysing the base or "working up the base," as it is termed; and this method promises more permanent cures than have been obtained by the usual treatment.

5. That certain diseases of the skin—herpes, eczema, and prurigo—may be treated by different methods of using electricity with the highest success.

6. That diseases of the skin may be treated by local and central methods of using electricity; but some of the most brilliant results in the treatment of eczema have been obtained by galvanising the nerve-centres, in the methods of central galvanisation, without making any application to the diseased parts. The results of this method of treatment seem to show pretty conclusively that chronic eczema is to a considerable extent dependent on the nervous system. (American Practitioner, July 1874.)

Analysis of Fifty-four Cases of Scarlet Fever.—Dr. Underhill states that there has been an exceedingly fatal epi-

denic of scarlet fever in Cincinnati, and the above number fell under his care. Seventeen, or 32 per cent., died, though in his first thirty-five cases only seven died. Twenty-three of the fifty-four were males, eight of whom died; thirty-one were females, of whom nine died. The average duration of treatment of the recoveries was fifteen days, and of the fatal cases four days and a half. One died in fifteen hours, one within twenty-four hours, and three within forty-eight hours subsequent to the first indications of disease. As regards the mode of death, seven died from the direct and overwhelming effects of the poison on the nervous system; three died by the exhaustion induced by the disease, two from laryngitis, one from inflammation of the membranes of the brain, one from diphtheritic exudation, and one from hydropericarditis. Of the whole number of cases treated, six were affected with dropsy, of whom all recovered but the one who died from hydropericarditis. Otorrhea occurred as a sequel in seven of the cases. Severe anginose symptoms were present in four of the cases; in the rest they were not particularly marked or dangerous. One of these cases in a woman of twenty was saved by leeches outside the throat, which was greatly swelled, the application of ice externally and internally. scarification of the tonsils, alcoholic stimulants, and the application of nitrate of silver solution containing forty grains to the One case occurred in a pregnant woman, but a painful rheumatic affection of the joints supervening, she was compelled to lie quiet and did not abort. Abscesses appeared in four of the cases. Of the fifty-four cases, thirty-one were between one and five, seventeen between five and fifteen, and five above fifteen. The oldest was twenty-six years, the youngest five The mortality was as great in the children between months. five and fifteen as in those not five years of age, but after the age of fifteen the mortality decidedly diminished. The seventeen deaths that occurred destroyed all the children of five families; five dying in one, and three in each of two others. The inherited constitution of the child seemed to have much to do with the severity of the attack, the children of parents whose vital powers were from any cause diminished being most dangerously affected, and in those cases treatment seemed to be of little avail. The fifty-four cases occurred in twenty-five families, and only eight of those not protected by a previous attack escaped. In none of the cases was there any complication of pneumonia or pleurisy, but several were affected with He employed as treatment in the several cases, bronchitis. alcohol, carbonate of ammonia, sulphuric ether, and camphor. He administered quinine in small doses throughout the disease, as well as carbolic acid, which he learnt to value, and the perchloride of iron. Blood-letting, except by the application of a

few leeches, and purgatives, he found inadmissible. The hyposulphite of soda was tried in three malignant cases without effect. The chlorate of potash was thoroughly tried, but he cannot admit he obtained from it any decided results. Inunction was effective in relieving the itching and burning of the skin. Warm baths (93° Fahr.) were very agreeable to the patient. In other cases, baths, the temperature of which ranged down to 65° Fahr., were used with advantage, the length of immersion varying from ten to fifteen minutes, but care and intelligence are required in their application. Cold douches or sponging may be more freely tried. He used emetics but once, and has no belief in the prophylactic power of belladonna. (Cincinnati Medical News, vol. iii. No. 6, 1874.)

New Researches on Podophyllin.—In a note on the results obtained in the clinique of M. Demarquay from the use of podophyllin, M. Gerard Marchant remarks that the recent memoir of Dr. Paul on the treatment of habitual constipation by this remedy has anew called the attention of practitioners to Podophyllin is the resin obtained from the root of the Podophyllum peltatum, a wild plant of North America. which is sometimes called the Carolina Ipecacuanha. It belongs to the class Berberidaceæ. Numerous experiments undertaken by M. Delpech demonstrate that podophyllin is composed of two resins, one of which is soluble in chloroform, ether, and alcohol, whilst the other is insoluble. It may be administered in the form of a pill combined with ginger or extract of hyoscyamus. Of forty patients to whom it was administered, three only were refractory to its action. One of these cases suffered from cancer of the uterus, a second from fibrous tumour of the uterus, and a third from stricture of the rectum. The effects of the administration of podophyllin are felt in about twelve hours. Its action is not accompanied by pain like that of aloes, nor by nausea like that of jalap, but by tickling sensations, gurgling, &c. The motions are semifluid, usually moulded, normal in colour, and contain a considerable quantity of bile. Podophyllin may be employed for a long time without producing any secretory disturbance of the digestive tube, providing it is not given in too large doses. In the cases under M. Demarquay, which were chiefly women, the dose was never more than a grain, and no ill effects ever followed; but the dose of half a grain is preferable. (Bulletin Général de Thérapeutique, Aug. 30, 1874.)

Department of Public Bealth.

DR. ANSTIE ON RESPONSIBILITY IN THE SANITARY MANAGEMENT OF INSTITUTIONS.

On the day after that upon which Dr. Anstie, during the examination of a septic corpse, received the puncture which killed him, the writer of this article had a long conversation with him on the state of things which, to that time, Dr. Anstie had observed in the Royal Victoria Patriotic Asylum for Girls. It seems due to him, in the pages of this journal, and in this section of it, to reproduce in substance what he then said; and his death, a remote consequence of the neglect against which he protested, gives a melancholy interest to this his last teaching in sanitary work. He made no reference to the wound he had received, and which must then have been beginning to work out its fatal consequences; and the writer left him impressed with the enthusiasm with which he had entered upon a difficult task.

Dr. Anstie first described the kind of sickness which was proving fatal among the children in the asylum. Its most obvious post-mortem sign was peritonitis, and the chief symptoms observed during life were explicable by this change found after death. He had, in fact, to deal with a local outbreak of peritonitis among children above the age of infancy, a form of the disease apparently unknown, and, at least so far as he had then been able to make out, unrecorded in medical literature. Here, then, was a new sort of malady to be observed; and all who knew Dr. Anstie will understand how this fact would stimulate into the highest activity the enthusiastic energy he exhibited

in his scientific work. A new field had been displayed before him in pathology, difficult of entry and full of obscurity, but interesting in proportion to the obstacles which beset a thorough elucidation. Provisionally, he regarded the peritonitis as an indication of a septicæmic state of the system, looking upon it as probably of the same character as the peritonitis observed in septicæmia artificially induced in the lower animals. In the direction suggested by this line of thought, he was casting about for a clue to the outbreak, and he was then engaged in clearing the ground for minuter research by examining into the ordinary sanitary conditions under which the children in the asylum He had first, after a general survey, given attention to the water supply; and here a state of things had been discovered which led him to suppose that other conditions of grave sanitary mismanagement would be disclosed in his further in-This supposition has been amply confirmed in letters addressed to the Times by Mr. Hawken, the medical officer of the asylum, and by Mr. Saxon Snell, an architect familiar, it would appear, with the sewerage arrangements of the asylum. The former describes (the Times, 16th September) a serious local defect of water supply in the asylum which was not known to Dr. Anstie at the time of the conversation here recorded; the latter describes (the Times, September several dates) sundry defects of the arrangements for the utilisation of the sewage of the asylum in the close vicinity of the asylum buildings.

The condition of the general water supply of the asylum found by Dr. Anstie, and which proved the text of the observations about to be recorded, was as follows:—The water, supplied by one of the water companies south of the Thames, was first received into a tank, in which was placed a charcoal filter, after passing which it flowed into other tanks, and was then distributed to the various parts of the building. In other words, notwithstanding the filtration of the water by the Water Company in the first place, arrangements had been made at the asylum for a second more efficient filtration of the water, through charcoal, before its use. This provision was as excellent as thoughtful, if it had been other than an egregious sham. But Dr. Anstie found the filter loaded with filth, and at the

bottom of the filtration tank, and of the other tanks, a large quantity of excessively foul sludge. That is to say, the means adopted to purify the water had been converted into a means of actually fouling it. In the then state of the filter, water passing through would necessarily carry along with it some of the filthy matter deposited in it. It was obvious that neither the state of the tanks nor of the filter had been looked to for a long time (how long a time did not appear to be known), and that there was no supervision deserving of the name over this important part of the arrangements of the asylum.

The absence of all proper supervision over the water supply of the asylum (and as we now know over other not less important sanitary provisions) was, Dr. Anstie observed, an illustration of a defect of management which prevailed to an untold extent in great schools and other public institutions, not even excluding hospitals, which was productive of much evil. The defect in question was a want of true sense of responsibility on the part of the managing body for the sanitary welfare of the persons under their charge, and a consequent laxity in the sanitary administration of the institution, sooner or later leading to distressing and not unfrequently fatal outbreaks of disease. There are few physicians who are not able to record histories of enteric fever and other serious maladies produced in schools and asylums, brought about as if they had been designed experiments to promote sanitary instruction, by the failure of managing bodies to appreciate rightly their responsibility for the sanitary requirements of the places they con-Putting aside the numerous class of cases in which managing bodies and their architects contrived, by a perversion of ingenuity which must have involved a greater degree of thought in getting wrong than in keeping right, to build institutions in such wise that on their first occupation the inmates necessarily suffered from enteric fever, Dr. Anstie dwelt solely on the class of cases like the Patriotic Asylum, where an institution, starting with reasonably thoughtful structural provision for the health of its inmates, is suffered to go seriously wrong. The evil in these cases depends essentially upon the fact that the sanitary care of the institution is dealt with as an incidental matter,

requiring only dilettante care, and for which no defined responsibility is needed. As a consequence, it is rarely held necessary to inquire systematically into the state of the particular arrangements for the water-supply and for the sewerage, with all the mechanical fittings connected therewith, until an actual breakdown occurs, indicated either by failure of mechanism or by occurrence of sickness among the inmates. The managing body does not undertake this duty itself, and does not fix the duty definitely on a responsible officer. It inquires vaguely as to sanitary arrangements when it meets; makes vague, superficial inspections; its officers catch the trick of vagueness and superficiality from their masters; there are neither minute examinations at regular intervals nor specific reports, and everybody drifts into a seventh heaven of self-complacent ignorance of the actual state of things, until aroused by an outbreak of mischief which it was the special object of the sanitary arrangements of the place to prevent, and which they would have prevented had they been kept in reasonable order as originally designed.

Two examples of this state of things were referred to in the conversation, in addition to the example of the Patriotic Asylum.

A large institution lately built and fitted up with arrangements for water-sewerage in the completest fashion; months go on, everything about the sewerage arrangements go wrong; the water-closets especially become a source of abiding nuisance; and at length a serious outbreak of enteric fever occurs among the inmates. Then much talk to the effect that it was obvious water-closets were entirely unfitted for the persons using them, and water-sewerage a dangerous delusion. The water-closets thereupon done away with, and earth-closets substituted for But not a month had passed before it was discovered that, so to speak, the institution had been removed from the frying-pan into the fire. A stinking water-closet was bad, but a stinking earth-closet was worse, and, the refined in stinks averred, infinitely more injurious. Then the earth-closets were said to be indescribably dirty and dusty within the buildings. The earth-closets were condemned and the water-closets replaced, the managing body now looking upon them and, it must NO. LXXVI.

be added, their concomitant, as it was thought, enteric fever, as necessary evils. Pending this change there had, however, been a change of manager. The change was effected, weeks rolled on, complaints of offensiveness from the water-closets ceased, and the recalcitrant mechanism became as orderly as the health of the inmates became sound. The secret of the change was simple. The new manager was one of those rare men who bring common sense to the aid of their duty. He had dealt with the mechanism of the water-closets and with all the arrangements for sewerage as such mechanism and arrangements are meant to be dealt with. He had had the mechanism of every water-closet and the working of every sewer, its inlet, outlet, and ventilating apertures, examined systematically at short intervals and kept in order. That was all.

Again, another institution of which the sewerage arrangements had been designed by an architect unusually competent and painstaking in such matters, and which had been carried out under his supervision. His final suggestion to the managing body was to appoint a competent man to look weekly to all the mechanical fittings of the water-closets, and generally to the state of the sewers, and to make some one officer definitely responsible for the proper working of the sewerage and water supply. The managing body went so far as to find a competent man, according to the architect's notion of such a man, and to inquire what sum he would want to induce him to make a weekly examination such as was held to be needed. He preferred to do the duty for £15 a year. The managing body thought they should most benefit the institution by refusing to give this sum and by looking after the sanitary arrangements themselves, and so everything with regard to sewerage and water-supply was left to chance care. Occasionally there was a stopped drain or some such trifling break-down, and the readiest jobbing builder was called in to rectify it. Four or five years rolled on, when the medical officer of the institution began to complain of foul smells about it, but he was curtly told that he had "an imaginative nose." The inmates and those in charge of them supported the medical officer's statement, but they were told that the smells only came from their own "dirty habits." Then a dropping case or two of erysipelas occurred and

diarrhea became common among the inmates. But the managing body had confidence in the original plan of sewerage. and refused to listen to the advice of their medical officer or call in the architect for a survey. Finally, enteric fever appeared in the institution, and an imminent danger of public exposure came with it. Then the architect and original builder were sent for and the sewerage arrangements looked at, and this was the state of things found :- The mechanism of every watercloset was more or less out of order; the drains had been interfered with at various points by the jobbing builders under direction of individual members of the managing body; traps had been put down promiscuously where they ought not to have been; drains directed into old long-disused cesspools; levels disturbed, and the whole system of drains transferred into a ramified cesspool.

In fact, as Dr. Anstie characteristically put it, the managing bodies of these institutions had played with their responsibility as to the sanitary arrangements of them with the results described, and the lesson he had proposed to teach in these pages, from these instances and from the instance of the Patriotic Asylum, was this:—The necessity which existed for a clearer insight among managing bodies as to the nature of the responsibility resting upon them respecting the sanitary management of the institutions under their care, and for fixing a more definite responsibility as to the sanitary arrangements upon the officers, or some of them.

PORT SANITARY AUTHORITIES.

THERE is perhaps no part of the Public Health Act of 1872 more important than the 20th and 21st sections, relating to the constitution and duties of port sanitary authorities. The mercantile marine of the United Kingdom now consists of more than 25,000 vessels, representing above $5\frac{1}{2}$ millions of registered tonnage, and finding employment for upwards of 400,000 men and boys. These vessels may be divided into three classes—

ocean-going ships, coasters, and barges and other river craft. Of the ocean-going ships, about 27,000 are entered in and 29,000 cleared from the ports of the United Kingdom annually. About 147,000 colliers, fishing smacks, and other small craft are entered and 151,000 cleared every year; and the third class, including all vessels that can boast of a deck, number several thousands. It is manifest, therefore, that whether we take note of the ocean-going ships, as importing disease into these islands from the continent of Europe or elsewhere, or of the coasters as conveying disease from one port within the kingdom to another, or of the barges and other river craft as disseminating the disease in and around the particular port, stream, or estuary to which they belong, the sanitary aspects are superlatively important.

Up to the close of last year the Local Government Board exercising powers under the sections of the Public Health Act above quoted, had by provisional order constituted in England and Wales forty-six port sanitary authorities. The terms of these orders may be conveniently divided into two parts-(1) As to the means required to be taken to prevent the importation of cholera; (2) As to supervising general sanitary work, by treating ships as houses, under the provisions of the Nuisances Removal Act 1855, the Nuisances Removal and Diseases Prevention Act 1860, the Nuisances Removal Act Amendment Act 1866, and so much of the Sanitary Act of 1866 as relates to ships and waters and persons engaged therein. The proper performance of these special and general duties implies the possession of a certain kind of knowledge that does not as yet exist among medical officers of health. The Local Government Board have therefore, as we think wisely, abstained for the present from codifying any set of rules for the guidance of such officers, and hence any well-considered suggestion should be acceptable to those who have the conduct of this new variety of sanitary operations.

The primary knowledge required by a port medical officer should of course be the general construction of a ship from upper deck to keelson. The ventilating arrangements are of course very important, and though these are, even in her Majesty's ships, very imperfect, much may be learnt by reading an article on Sanitary Science in Ships that appeared in Naval

Science for April 1873; three papers on the subject read at the United Service Institution by Dr. Edmunds, R.N., Dr. Denis Macdonald, R.N., and Admiral Ryder; a Report on Emigrant Ships in the Lancet for 1873; and a Report on the Hospital Ship Victor Emanuel in the same journal of the same year. We refer to these authorities because it is impossible to give, within the limits of this article, the kind or quantity of useful knowledge that they contain. It is necessary also that a port medical officer should have a knowledge of those sections of the various Merchant Shipping Acts, and especially the Act of 1867, as far as they relate to sanitary subjects; for these Acts include special provisions relating to the accommodation of seamen. food, antiscorbutics, and medicines: and the Board of Trade still order an official inquiry to be held whenever a severe outbreak of scurvy has occurred among a ship's crew, so that it is presumably the duty of the port medical officer to make the Board acquainted with the existence of this disease on board ship immediately after arrival. The sanitary clauses of the Emigration Acts are also worthy of attention, because in certain cases co-operation with the Emigration Officers of the Board of Trade, lay and medical, may be advisable and necessary. It is desirable to glean some information as to the sort of rations in common use in ocean-going and coasting ships, and to know the sort of cargoes that certain lines of vessels usually ship or bring. It is specially important to become familiar with the storage of water on board ship, the sources of the supply, and the condition of the cocks or tanks in which it is stored. The routine duties of a port medical officer are set forth in pages 18 and 19 of the first half-yearly Report submitted to the Port Sanitary Committee of the Corporation of London by their Medical Officer of Health, and indicate items of work which, if the port is at all scattered or extensive, require a large amount of physical exertion. And inasmuch as the 20th section of the Public Health Act of 1872 recites that "a port shall mean a port as established for the purposes of the laws relating to the Customs of the United Kingdom," all land spaces within the walls or boundaries of any dock or docks are within the jurisdiction of the Customs and d fortiori of the port sanitary authorities. This is of course supplemental work, but

it is nevertheless very important, for it will be found that the drainage, latrine, and closet arrangements of many docks are most defective, and that the dock-labourers, although not permanent residents, create a vast amount of nuisances during the working hours by their insanitary habits. For it must be remembered that, although it may be very convenient, it is very improper to drain into a dock, and that all ships' closets and latrines ought to be cleansed and locked up as soon as possible after the vessel has hauled in: for when it is considered that the water is usually stagnant, and that any flow or change is the exception rather than the rule, the discharge of drainage from the yards and of excrement from the ships' closets will speedily convert a dock into little better than a huge cesspool. (We are of course referring to docks that accommodate vessels the majority of the crews of which live on board.) other items of work to which attention should be directed. Parcels of clothes are frequently forwarded from abroad, or are brought home as the effects of sailors who have died at foreign ports or at sea from some contagious or infectious disease. In these cases it is the duty (not indeed actually expressed, but clearly indicated, by the terms of the Act) to see that such clothing is properly disinfected before landing, or destroyed. The disinfection can be most conveniently performed by the inspector on board the ship, and a certificate should be given by him before the effects are landed.

We have recapitulated some of the information that should be acquired by, and the duties appertaining to, port medical officers in the execution of their ordinary duties; duties, that is to say, more immediately connected with vessels when at anchor, at moorings, or docked. But the powers that can or should be exercised to prevent the importation of an epidemic disease are perhaps more important. It may or may not be within the knowledge of our readers that under the old quarantine laws (6 Geo. IV. cap. 78) the Customs authorities are still empowered to detain all vessels that arrive at ports in this country infected with plague or yellow fever. These are, therefore, par excellence quarantinable diseases, and as a matter of law, quarantine regulations can in this country be only applied in such cases. The entire question of quarantine as practised in

other countries, with all its costly, vexatious, and useless restrictions, has been lately discussed at the International Sanitary Conference at Vienna, and the opinions then recorded are doubtless the first step to the abolition of the present system in Europe and elsewhere. This by the way. We are concerned with the law as it now stands. By an Order in Council issued by the Local Government Board and dated July 17, 1873, and relating exclusively to cholera, certain amended regulations are set forth which authorise the detention of any vessel by an officer of Customs that is presumed to be infected with cholera. such officer giving immediate notice of the fact to the port sanitary authority, which latter, on such intimation, causes the vessel and her crew and passengers to be examined by their medical officer, and, if any cholera be found, further detained for purposes of fumigation and disinfection. Art. 7 of the Order gives power to the officer of the sanitary authority to visit any vessel that he has reason to believe is infected with cholera, even if notice has not been given by the Customs. But ordinarily the preliminary examination is conducted by the Customs. As soon as the Order appeared, the Commissioners of Customs prepared and issued to their examining officers at every port a list of questions relating to health, which are read to the master of the ship by the officer as the latter sits in his boat alongside. The master then signs a copy of the replies that he has made to the queries put, and if the existence of no disease is indicated the examination is complete. Customs officers were (and we believe still are) furnished with a list of foreign ports infected with or suspected of cholera. On the Tyne, and at Hull, Hartlepool, and King's Lynn, the provisions of Art. 7 of the Order were strictly carried out last year, and every vessel on arrival from an infected or suspected port was boarded and examined by the port medical officer. But at all other places the sanitary authority trusted to the system adopted by the Customs, and did not take any action unless the existence of disease was reported to them by their officer.

It appears to us that the regulations as to Customs inspection are, as hitherto carried out, manifestly defective, and utterly insufficient to prevent the introduction of disease. The Reports already issued by the Port of London Sanitary Committee record four cases in which the system proved abortive, and disease was found on board after the vessel had been (in a sanitary sense) cleared and had passed up the river. No satisfactory examination can be made unless the vessel is actually boarded by the port medical officer or one of his assistants, and the crew and passengers inspected as well as the official logbook, which latter, in the case of British vessels, shows at once if any sickness or deaths have occurred during the voyage. The question of detention is, commercially speaking, one of serious moment, and a working plan has yet to be framed for such crowded ports as London and Liverpool, where vessels by scores come in with every tide, and where, even in the presence of an epidemic of cholera in the northern ports of Europe, very little delay in the examination of vessels on arrival would be brooked by commercial men. It is, however, a matter of organisation, for we believe that if the Order above referred to be intelligently administered, the Customs and sanitary authorities working well together, a very excellent safeguard is provided against the introduction of disease into the country by water-way, a safeguard infinitely superior to the old system of quarantine. But its application, to be useful, must be universal and simultaneous at all ports, and it would be well that (guided or not by the Medical Department of the Local Government Board) port sanitary authorities should meet and agree precisely as to the practical interpretation of the Order, so that proper machinery may be ready when we are next threatened with an epidemic.

Enough has been indicated here to show that the ordinary and special duties devolving upon port sanitary authorities are by no means few or unimportant, and are calculated to influence the sanitary condition of the country in a very great degree.

HOSPITAL ACCOMMODATION FOR INFECTIOUS DISEASES.

It is hardly too much to say that a principal cause of the sluggishness with which sanitary authorities carry out the provision of the Sanitary Act 1860 (Sec. 37), which enables them to make hospital accommodation, has been a doubt as to the efficiency of such accommodation as a means of limiting the spread of infectious disease. The cost of the accommodation and of its maintenance was clear and rarely inconsiderable, unless in that comparative sense which ratepayers repudiate: whereas the good to be effected, except in the relief of sickness. which did not concern the Authority, was rather a medical inference than an observed fact. Of the instances in which the provision of the Act has been put in operation, in the greater number it would appear to have been acted upon in order to meet the pressing sickness emergency of an epidemic, rather than from an appreciation of the power it gave to the sanitary authority of suppressing or largely controlling the spread of an infectious malady. Hospitals for infectious diseases are, in fact, in the same position now that schools were in before the passing of the Education Act of 1870. Without schools, education among the classes to which the Education Act chiefly applied was an impossibility: without hospitals, the isolation of infectious diseases among the classes for which the accommodation is intended is also an impossibility. The schools were the preliminary condition of any education of the kind sought by the Education Act: the hospitals are the preliminary condition of the isolation of infectious diseases for the purpose of limiting their spread, sought by the Sanitary Act.

As throwing light upon the value of isolation as a means of controlling the spread of epidemic disease, a Report recently made to the Local Government Board by one of its assistant medical officers, Dr. Buchanan, has a far wider interest than its subject indicates. The Report in question relates to small-pox and other infectious diseases, and to hospital accommodation in Birmingham and Aston. It gives the result of an inquiry lately

made by Dr. Buchanan, under instructions from the Local Government Board, as to the unusual prevalence of infectious diseases, particularly of small-pox, in the places named. mingham (including under this term for our present purpose Aston also) is particularly defective in hospital accommodation for infectious diseases, both as to voluntary provision and poorlaw provision; and the Corporation, as sanitary authority, has not as yet made any except slight temporary provision. In discussing the question of the necessity of the sanitary authority providing hospital accommodation, not only as a means of controlling existing infectious disease, but also as a means of limiting future outbreaks, Dr. Buchanan brings together certain illustrations of the efficacy of hospital accommodation to these ends, of remarkable interest, and which, if made widely know among sanitary authorities, cannot fail to exercise an important influence upon their judgment. He contrasts the progress of small-pox in relation to hospital accommodation for the disease during its still unexpired epidemic extension in this country, im-London, Coventry, and Birmingham; and shows that the duration of the outbreaks in each of these places respectively was inversely to the quantity of hospital accommodation. data upon which this conclusion is founded are so important that, the Report only having been published in the locality to which it refers, we give them without curtailment on the opposite page.

Upon this table Dr. Buchanan observes:-

"A very different progress of the small-pox epidemic, as compared with London and Coventry, is here seen. Small-pox was seriously epidemic in London for seven quarters of 1870-72, but by the end of 1872 had diminished to small proportions. It was still more seriously epidemic in Coventry for six quarters of 1871-72, and then, in the middle of 1872, was almost suddenly and totally extinguished. But in Birmingham it was mildly epidemic for five consecutive quarters of 1871-72; was still prevalent, though less so, throughout 1873; and now in 1874, when London and Coventry are free from the disease, Birmingham is suffering under a sharper visitation of it than at any former period since it first appeared in the borough. Thus, though the total loss by small-pox in Birmingham has as yet been considerably less than in the very serious epidemics of London and Coventry, it is apparent that, for Birmingham, a large remainder of the epidemic is still to come. It may even be surmised that unless action in repression of the disease be more successful in the future than in the past, the greater part of the total mortality in Birmingham may yet be to come; that the town is, in fact, in some such place in the course of its local epidemic as was occupied by London in the beginning of 1871, or by Coventry in the middle of that year."

SMALL-POX DEATHS.

	In LONDON of the Registrar-General. Population (1871), 3.251,804.		In BIRMINGHAM Borough. Population (1871), 343,787.		In COVENTRY Registration District. Population (1871), 40,113.	
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	Actual deaths.	Per 10,000 of Populatn.	Actual deaths.	Per 10,000 of Populatn.	Actual deaths.	Per 10,000 of populatn.
- quarter	99	0.30	3	0.09	0	0.00
- 1	118	0.36	ō	0.00	ŏ	0.00
"	157	0.48	Ŏ	0.00	ŏ	0.00
"	584	1.80	0	0.00	Ö	0.00
ole year	958	2.94	3	0.09	0	0.00
- quarter	2,400	7:35	1	0.03	4 (1)	1.00
- !	3,241	9.94	ą.	0.12	$14^{\circ}(2)$	3.49
"	1,255	3.86	11	0.32	61 (3)	15.18
"	980	3.01	45	1.31	87 (4)	21.60
ole year	7,876	24.15	61	1.78	166	41.27
-	831	2.55	96+	2.80	‡ 48 (⁵)	11.90
quarter	582	1.79	94	2.74	8 (6)	1.98
· "	237	0.73	65	1.89	ĭ	0.25
"	131	0.40	43	1.25	ō	9.00
ole year	1,781	5.47	298	8.68	57	14.13
-	46	0.14	29	0.85	0	0.00
quarter	37	0.11	37	1.08	Ö	0.00
٠,,	15	0.05	18	0.52	ŏ	0.00
• • • • • • • • • • • • • • • • • • • •	17	0.05	38	1.10	ŏ	0.00
ıole year	115	0.32	122	3.55	0	0.00
– quarter	24	0.07	122	3.55	0	0.00
ril and } May . }	3	0.01	132	3.85	(?)	(?)
	* In June 1871, the hospital accommodation reached its maximum: about 2,600 beds, or 8 beds per 10,000 of population.		† In February 1872, the hospital accom- modation reached its maximum (apart from additions recently made). This amounted to about 100 beds, or less than 3 beds per 10,000 of population. Used by paupers, al- most exclusively.		† In January 1872, about 30 beds were provided; being 74 beds per 10.000 of po- pulation. Used by all classes.	

Notes on Coventry, from Registrar's Quarterly Return.

tion.

The four cases all occurred in one family; the father was strongly prejudiced against velve of these occurred in Holy Trinity Sub-district. Not one of the twelve people who i been vaccinated.

onote.

'the eighty-seven deaths, at least thirty-one were in unvaccinated persons.

'the forty-eight deaths, twenty-eight occurred in January, fourteen in February, an larch.

'six fatal cases in Holy Trinity Sub-district, five occurred in April, and one early in May.

Dr. Buchanan is unable to see in the remarkable contrasts in the course of the epidemic in the three towns, differences explicable by different states of vaccination in them. Making every allowance for difference of quality and quantity of vaccination between the three towns, something else must be looked for to explain the diversity of duration of the epidemic in them. This difference Dr. Buchanan holds to have arisen from the greater or less copiousness of the hospital accommodation provided by the sanitary authority. Upon this he observes:—

"Small-pox, as well as other infections, is capable of being wonderfully limited by isolation in hospital, and the amount of provision made for such isolation may be expected to affect materially the rate at which an epidemic of small-pox becomes extinguished. Without quoting as illustrations of this fact other instances where copious hospital provision for all classes has appeared rapidly to stop the spread of small-pox, comparison in this respect may be made between Birmingham on the one hand and London and Coventry on the other. In the latter towns, hospital accommodation for small-pox was provided at the rate of seven or eight beds per 10,000 of population, and all classes of the population made use of this accommodation. In Coventry, two buildings were provided for small-pox. One of them, opened in January 1872, at the height of the epidemic, received nine patients in the first four days. During February it received patients at the rate of one in two days only. In the first nine days of March four other patients were admitted, and that was all. This hospital was closed on March 30, though a few other cases were sent to the second hospital. Notes to the foregoing Table will show that the disease was almost wholly extinguished before May. In Birmingham, during the whole three years 1871-73, the hospital accommodation never amounted to three beds per 10,000 of population; and these beds, though open during 1872 to non-pauper patients, whom for sanitary reasons the Town Council thought fit to remove, were not appreciably used by any but the pauper class.

"It does not appear that there was any abstract objection on the part of other classes to removal to hospital; they went to hospital freely enough in London and Coventry. But apparently at Birmingham they did object to the notion of pauperism involved in removal to the Winson's Green Hospital on the workhouse grounds. This difference in the amount of hospital provision and in the classes that made use of it must certainly be taken into account in estimating the reasons for the observed prolongation of the epidemic in Birmingham as compared with London, Coventry, and other places that might be mentioned."

Dr. Buchanan, in support of his conclusion, refers to certain differential experiences recorded by Dr. Blaxall, of the Medical Department of the Local Government Board, as to prevalence of small-pox in Plymouth and Devonport. The one town adjoins the other, but the epidemic was of twelve months' duration in Plymouth, but a little over four months only in Devonport. The disease appeared in Plymouth in May. In July a hospital con-

taining fourteen beds was opened. The disease continued to spread, and in January 1872 it was found necessary to open another hospital of thirty-six beds. A third hospital was opened, containing eighteen beds, the same month; and a fourth hospital (of which the number of beds is not known to the present writer) had to be opened in March. The epidemic persisted until May 1872. Contrast this with Devonport. The epidemic appeared in that town in September 1871. On the 11th October a large hospital containing 100 beds was opened, and in February 1872 the epidemic was at an end. These examples tell their own story without the necessity of comment.

Dr. Buchanan enters with considerable detail into the question of the amount of permanent hospital accommodation required for infectious diseases in Birmingham. The principles upon which such accommodation should be furnished are set forth in a memorandum issued by the Local Government Board on the hospital accommodation to be provided by local authorities. Here we propose to refer only to two other points dwelt upon in Dr. Buchanan's Report, namely, first, the number of beds to be provided for a community, and next, the site of infectious disease hospitals.

As to number of beds, it would appear that a reasonable estimate of the amount of permanent hospital accommodation which it is generally desirable to make in towns against infectious diseases, is at the rate of one bed per 1,000 of population. In Birmingham Dr. Buchanan adopted another estimate, somewhat above this amount. The deaths from infectious diseases in Birmingham, exclusive of Aston, amount to 800 annually, the number of attacks of sickness represented by these deaths being taken at 8,000. A third of the cases of sickness, namely, 2,666, may be considered as occurring under circumstances which would render it desirable to remove them to hospital as a measure of disease prevention. To accommodate this number of cases, and for a population of 231,000, it would be necessary to provide permanently 266 beds, and this provision, divided into two hospitals, Dr. Buchanan advises to be made. Each hospital, he suggests in a summary of his observations on the subject, should consist of "(1) An administrative block; on one side of it (2) a pavilion and vacant ground for small-pox; on the other side of it, first (3) a fever pavilion, and next (4) a scarlatina pavilion, with vacant ground near it: a pavilion signifying two wards, each of twenty beds (one for males, the other for females), with at least two adjacent smaller wards, offices, and also advantageously rooms for convalescents. The arrangement here proposed would, of course, have a certain elasticity. Thus, if at a particular time there were no small-pox but much scarlatina in the borough, it might be right to use provisionally, and after due disinfection, the small-pox pavilions, for the reception of the excess of scarlatina patients, instead of erecting temporary wards for scarlatina while the small-pox wards continued empty. At each hospital, besides the usual out-places, there should be a disinfecting chamber near to the laundry, and a shed for ambulances."

It is difficult to procure sites for infectious disease hospitals in towns, from the objections not unnaturally entertained by the holders and occupiers of neighbouring property to have such hospitals in their vicinity. Birmingham has been put to great straits on this account, in acquiring proper sites. The following observations by Dr. Buchanan on the subject show that the objection has no substantial foundation, so far as danger of dissemination of the disease from the hospital is concerned:—

"As regards site (and this applies equally to the sites of temporary and of permanent hospitals), the first condition is that it should be readily accessible to those who want accommodation in the hospital; and the opinion given by some medical men in Birmingham—that an infectious hospital 'should be removed as far as possible from human habitations '-can only be considered a figure of speech. To carry a person suffering under acute disease to any unnecessary distance from his home to hospital, is to excite in his friends objection to the transference, and wantonly to expose the patient himself to pain and danger. As regards the distance which, on medical grounds, it is right to secure between adjacent inhabited houses and an infectious hospital, I know of no evidence as to what proximity, if any, can be a danger to persons not actually under the same roof, but there is abundant evidence to show that very short distances suffice to prevent direct infection. I say 'direct' infection, because such infection as may come from the use of infected cabs and ambulances, or from dealing with patients' infected clothing, is, as being merely a question of discipline and foresight, obviously not here in question."

It is deeply to be regretted that Reports like this of Dr. Buchanan's should not be readily accessible to the public. The policy which deals with Reports of this kind as merely of local interest is as injurious to the public as to the Department from which the Report emanates.

THE SANITARY ADMINISTRATION OF THE LOCAL GOVERNMENT BOARD.

The third Annual Report of the Local Government Board, now published, admits us, after a fashion, into the arcanum of the Board. It is the final Report of Mr. Stansfeld's presidency, and it contains abundant matter for judging of the action of the Board in its sanitary administration from the Board's own statements. So much of the Report as refers to the steps taken by the Board in the appointment of sanitary officers, namely, medical officers of health and inspectors of nuisances, is obviously intended to justify Mr. Stansfeld's policy on this subject, and if plausibility is to be regarded as the proper upshot of Departmental explanation, the Board may be complimented on this effort.

Next in sanitary interest, in the Report, to the question relating to general sanitary administration, is the question of ophthalmia in pauper schools. Two lengthy reports on this subject appear in the appendix, one from Dr. Bridges, and the other from Dr. Fredk. J. Mouat. Both are of remarkable interest, but, as was to be anticipated, neither those Reports nor the Report of the President show why it should be necessary, before the Board should have taken some measures to bring about the removal of so grave an evil, that it should first become a public scandal. The outbreak of ophthalmia, it will readily be admitted, after reading the Report of Dr. Bridges, occurred under exceptional difficulties in the management of workhouses and workhouse schools; but the public question is, how, having at command the kind of knowledge shown in the report of Dr. Bridges, so little was done to give effect to it until the state of the affected schools became a matter of public notoriety—until the malady, indeed, had grown gradually from small and probably readily controllable limits, to the serious proportions in which it first became known to the public?

Mr. Stansfeld, commenting on the case of the North Surrey Schools, which had "suffered for a long time from a very troublesome epidemic of the malady," and from which it was

at last necessary to remove "more than 300 affected children" into an unoccupied building and place them specially under an ophthalmic surgeon, remarks: "It may be well to state, in view of the somewhat exaggerated statements which have been made with reference to this school, that out of the very large number of children affected (to use the words of Mr. Nettleship, the oculist, who has been entrusted with their treatment), in no one instance has sight been anything like lost" (p. xxix). Need more be said to prove the inability of poor-law administrators to comprehend sanitary requirements, and the fatal blunder which was made in placing the sanitary administration of the kingdom under the control of the old poor-law officials? The late President of the Local Government Board sees no incongruity in protesting against the "somewhat exaggerated statements" which had gained ground respecting a pauper school, from which it had been necessary to remove, under special care, 300 scholars, and in congratulating himself and his administration that none of these scholars had become actually blind! Did it ever occur to Mr. Stansfeld to ask, regarding the defects of vision short of blindness, averred by Mr. Nettleship's remarkable sentence, what' effect they might have upon the future power of the children in earning a livelihood and escaping from pauperism?



THE PRACTITIONER.

NOVEMBER, 1874.

It might be remarked of some men that they are gone but not missed; their selfish lives have been useless to their fellow-men. and their absence leaves no void, or it might even be felt as a positive relief. Others, again, of kindlier and more generous natures, may be deeply bewailed by their friends and relatives. but their loss is not felt beyond the family circle, and excites no interest except among a few personal acquaintances. instances, again, death creates a blank which is not merely noticed by a few, but is mourned as a calamity by the whole community. Sometimes, however, this general mourning is nothing more than an expression of regret for the loss of an efficient agent who has benefited the public by filling offices and discharging duties which none but he could satisfactorily perform, and whose absence therefore causes more or less inconvenience and confusion. Far different are the feelings awakened by the death of such a man as the late Dr. Anstie. is true, we regret the loss of a useful life; of a leader in the fore front of medicine, whose active exertions and laborious investigations have already done much to advance it from the position of a mere art to that of a science, and of a teacher whose keen eye at once discerned the right way, and whose clear voice proclaimed it to others with no uncertain sound. Such a man we can ill spare,—but this is not all. In him we

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deplore with heart-felt sorrow a high-souled, generous man, whose strict integrity, love of truth, and vigorous denunciation of falsehood, injustice, and wrong, gained him the respect of all good men; and a trusty friend whose kindly heart lent its own warmth to all around, and kindled a sympathetic glow in the breast of everyone with whom he came either directly or indirectly in contact.

Even those who knew him through his writings only, must, we believe, share the grief of his personal acquaintances; for his strong individuality made itself everywhere felt, and everything he said or wrote bore the marked impress of his character. And this will be done by the readers of the *Practitioner* more than by others, for nowhere were his characteristics so clearly shown as in his writings for this periodical, which he chiefly originated, and which owes its success to his sound judgment and ready pen.

In attempting to take up the editorial work which has so suddenly and unexpectedly fallen from his hands, we feel that it is at the same time very difficult and very easy to succeed him; for while we cannot hope to rival his facile writing and admirable style, he has himself smoothed his successor's way by furnishing an example which will keep us from going far astray if we only faithfully follow it. This we intend to do, and we shall strive to the best of our ability to make the Practitioner in future what it has been in the past—a real aid to those who feel that the great end of all their art is to relieve suffering and remove disease. In doing this, however, we shall not be unmindful of Bacon's maxim, applicable to physicians as well as surgeons, that "they be the best chirurgeons which, being learned, incline to the traditions of experience; or, being empirics, incline to the methods of learning." We shall therefore take care that the Practitioner shall contain information regarding the various methods which have been found practically successful in the treatment of disease both in this country and abroad. At the same time, new discoveries regarding the exact nature of the action of drugs, as well as those physiclogical and pathological researches which tend to render cine exact, shall not be omitted. For these discoveries us the reasons why the treatment which is usually sucil sometimes fails, and indicate the course we ought under circumstances to pursue. They may thus enable us sucally to combat disease by the scientific use of remedies ı all the resources of empiricism have been tried in vain. ace the action of drugs is now studied in a different way that which was in vogue a few years ago, the results of rn experiments may not be readily understood by many who studied at a time when physiology and therapeutics less closely connected than they are now. Especially is the case with those who have been busily engaged in ice from their student-days onwards, so that they have not ime to keep up with the rapid progress of medical science. the benefit of such of our readers we intend to place e them, in a series of articles, a simple account of the way ich the various groups of drugs act, so far as it has yet been imentally ascertained. By thus bringing them abreast r present knowledge, we hope to enable them to profit more than they have hitherto done by the accounts we continue to publish of scientific work done in Germany and e as well as in America and our own country. xtracts from British and Foreign Journals, the Clinic for the h, the Reviews of the works on Therapeutics, the departof Notes and Queries, the Bibliography for the month, and shough not least, the Department of Public Health, will be nued as before. We are very glad to say that many of minent men whose original papers have already appeared le Practitioner have kindly promised to continue their ance; and others, no less eminent, who have hitherto en nothing for the journal, have also intimated their tion of contributing. But while we rejoice in the support ese able writers, we do not desire contributions only from who have already gained a reputation by their writings. are fully persuaded that almost every busy practitioner in course of his experience makes many observations and res much knowledge which would be most valuable to

Much of this is lost because extensive practice leaves little time, and the fatigues of the day leave little inclination, to write elaborate papers. Thus it happens that the very men who possess the soundest knowledge of their art, have had the widest experience, and are the most successful in practice, communicate less information to their fellows than those who are comparative tyros in their profession. This ought not so to be, and we therefore earnestly desire busy practitioners who have no time to write complete articles, to send us, whenever they can, any notes, however brief, of the modes of treatment which they find most successful in any disease, the class of cases in which they employ one mode rather than another, and the symptoms which induce them to administer any particular remedy. These notes we shall lay aside until we have accumulated a number of them. We shall then classify them, and shall publish from time to time a digest of the treatment of some disease. This shall be accompanied by an article on the pathology of the disease, and sometimes also by a brief account of the physiological action of the remedies employed. In this way we hope to throw new light on the relations between pathology and treatment, and to learn, by comparing their effects at the bed-side, some of those finer differences between the action of nearly allied remedies which are apt to escape notice in laboratory experiments. We sincerely trust that our busy readers will aid us in this scheme, and we hope that with their active co-operation, and the assistance of our able contributors, the Practitioner may continue to be what its late lamented editor would have wished, and may assist the advance of scientific Therapeutics which he had so much at heart.

THE EDITOR

NEPHRALGIA, LITHURIA (LITHIASIS), AND OXALURIA.

BY W. R. BASHAM, M.D.

Senior Physician to the Westminster Hospital.

(Continued from p. 261.)

TREATMENT.—It cannot be too forcibly impressed that these disorders are symptomatic, not of renal disease, the kidneys being only the channels through which certain excrementitious products are discharged, but of disturbances in remoter organs, which minister to nutritive assimilation, and which when at fault, either by errors in the kind, quality, or quantity, whether liquid or solid, of the food, or by defective power in the organs chiefly employed in preparing the food for the sustenance of the vital forces, cause the equilibrium of the oxidised products of metamorphosis to be disturbed, and these educts of defective oxidation to appear in the urine.

It is therefore to the hepatic and allied organs that attention must be directed in our endeavours to control or remedy these disturbances in the urinary secretion; and it is most essential for the successful treatment of these urinary disorders to keep in view the important relation of the hepatic and gastric functions to the due preparation of healthy urine.

Irrespective of the symptoms of nervous depression and hypochondriasis which oftentimes predominate in these cases of lithiasis and oxaluria, there are unmistakable signs of both gastric and hepatic derangement expressed by flatulent distension after food, occasional attacks of heartburn, with acid or watery eructations. The tongue is commonly furred, and there is an unpleasant perversion of the sense of taste, in the form of a bitter, clammy feeling in the mouth; yet, notwithstanding, the appetite is good, and the relish for food natural; there may be occasional inappetency, and sometimes a slight feeling of nausea in the early morning. The urine accompanying these symptoms is highly acid. Micturition is often frequent, and the sediment may either be red sand, or an abundant deposit on cooling of microscopic crystals of the various forms of lithic acid, mixed with many crystals of oxalate of lime; or in other cases the chief characteristic of the urine will be the large deposit of urates on the urine cooling, accompanied also by a free deposit of oxalate of lime.

The most effective remedies for the relief of these symptoms are mild alteratives of blue pill and rhubarb, one grain to three or four of the compound rhubarb pill, taken every night for four or six nights, followed each morning with a mild dose of one or other of the saline bitter waters: either Carlsbad, Friederichshall. or Püllna-in some cases the Marienbad (Fredericksbrunnen) may be preferred. These saline laxative waters are, even as imported waters, far more effective than any factitious imitation of them: and if their efficacy, drunk away from their sources. be less than when accompanied by the refreshing influence of the pure air, the change of scene, the altered habits of diet and regimen, early hours, and the absence of all those business cares which tend so largely to induce the state of health here described, yet the benefit they produce, the change in the character of the secretions, the aspect of the tongue, the revival of the spirits, and the removal of many of the fancies of the hypochondriac, convincingly assure us that their action is far more certain and enduring than any ordinary laxative saline which the physician can prescribe. It may be readily conceived that diet will play an important part in these disturbances of the hepatic, gastric, and urinary functions. Errors of diet and regimen are in the majority of cases the palpable cause. In others, it is difficult to trace them to such sources; there may be a special hereditary susceptibility; but whatever be the origin, moderation of diet, regular habits. uniform hours of meals and rest, fresh air, and exercise, are essential auxiliaries to the medicinal treatment.

The symptoms of gastric disturbance in the severer cases of lithuria are oftentimes very distressing to the patient, and lends not a little force to the hypochondriasis and mental depression. Each meal is followed by uneasy sensations of fulness and flatulence: frequent attacks of heartburn with acid or watery eructations daily, if not hourly, remind the patient of his maladies. The treatment in such cases must at the outset be more active. A brisk mercurial and resinous purgative (calomel and colocynth) should be followed by some warm adjuvant, such as the Beaume de vie (decoct. aloes comp.), with the addition of a drachm or two of Rochelle salt, and for a week after the Carlsbad water in moderate quantity, each morning. Even after such brisk treatment the primary stage of digestion does not quickly or healthily perform its task; the gastric glands do not supply the necessary solvent, or at least it is deficient in digestive energy.

The result of observation convinces me that in these cases of flatulent disturbance, soon after food is taken, the deficient agent is the mineral one, and not the organic. Viewing the gastric juice as composed of pepsin and hydrochloric acid, it appears that it is the latter agent which is deficient in these cases of flatulent irregularity, and not the pepsin,—at least this is the deduction, not, it is true, from direct chemical analysis, but from the results following the treatment of this imperfect gastric digestion by hydrochloric or nitro-hydrochloric acids. After a preparatory alterative treatment as above sketched, the patient should take a few minutes before food, and this should be limited to three times a day, about ten minims of the dilute hydrochloric acid, or a like quantity of the nitrochloric acid, in a wineglass of the infusion of orange-peel.

The primary stage of gastric digestion is thus accelerated, and those molecular changes in the albuminous and fibrinous and amylaceous elements of food, resulting in a fermentative process, generating certain gaseous products, prevented; and the chyme more completely formed, passes, without these gaseous adjuncts, the portal of the stomach, ready to undergo the ulterior changes necessary for its conversion into the blood-forming chyle.

In the employment of these mineral acids, the nitric or the hydrochloric, in these cases of atonic gastric disturbance, there is one point of great clinical importance to be kept in view, and

that is the probable existence of any degree of hepatic congestion. Should such condition be present, the acids will not agree; vegetable bitters with an alkali will be more suitable. But it is very certain that if the preparatory alterative treatment already suggested be first enforced, the probability of hepatic congestion will be obviated and the treatment by the mineral acids more consistently pursued.

Lumbago is not an unfrequent accompaniment with lithuria. For many days preceding an attack of lumbago, an observant patient will notice his urine more or less loaded with lithates, or even red sand, accompanied by a tendency to sluggish bowels. A little blue pill and rhubarb, with some laxative saline, for two or three successive mornings, will in most cases bring relief.

The treatment, thus sketched, for the disordered conditions described in the paper of last month, has for its object, as will be perceived, to remove those functional derangements which are the origin and cause of the urinary disturbance. necessary also to remind the reader that many local symptoms, such as irritation of the urinary passages, annoying frequency of micturition, lumbar pain, as well as wandering pseudo-rheumatic pains in the limbs and muscles, are distressing to the patient, and do not yield readily or quickly to the agency of those remedies which are calculated to remove the origin of the The special symptoms may be temporarily mitigated disorder. while the general principle of treatment is being carried out. Thus, the irritation of the renal channels may be effectually moderated by the potash and lithia salts taken with lemon juice in an agreeable effervescing form; the pseudo-rheumatic pains may be relieved by hot baths, while the alterative treatment is securing the patient from a renewal of the disorder when these special local symptoms have passed away.

There is one other symptom which is so common to these tirinary disorders, continuing only so long as the blood is charged with these excrementatious products, and disappearing with the return of a freer and more active oxidation of the albuminous and amylaceous elements of food, that these remarks on treatment would be imperfect by an omission to notice it. It is, moreover, to hypochondriac patients often a most depressing and enervating symptom:

Intermissions of the pulse, and sometimes irregular action of the heart, are very common in all these disorders. Hypochondriacal patients are much given to examine their own pulse. The fact of the irregularity and intermission of the regular beat does not fail to suggest to the nervous anxiety of the patient that he may be the subject of disease of the heart, and he labours under this depressed sentiment to the disadvantage of the treatment he may be undergoing. It is a simply functional derangement in the action of the heart on a vitiated blood, which fails to impart sufficient stimulus to produce a complete and effective systole. These intermissions are but pulseless systoles, and quite unconnected with any organic disease of the heart. In the majority of such cases arising from blood charged with the products of a defective oxidation, the most effective remedy, and the one most speedily restorative, is moderate outof-door exercise.

Early rising, cold or tepid baths, according to the habits or constitution of the patient, a free use of the flesh-brush in the bath, followed by exercise on foot or horse in the early morning air, short of fatigue, but sufficient to moisten the skin with a slight and healthy perspiration, will very soon remove these intermissions of the pulse, while the remote cause of both them and the urinary disturbance are thus successfully combated and removed.

Nephralgia, lithuria, and oxaluria may be and sometimes are the antecedent or premonitory symptoms of renal calculus. It is certain that most cases of calculous kidney will afford the history of a stage in which one or more of the above symptoms, in conjunction with others truly typical of renal calculus, are present. It is proposed to defer to another occasion the consideration of the early and mature stages of calculous diseases of the kidney.

ON THE TEACHING OF MATERIA MEDICA AND THERAPEUTICS.

BY W. HANDSEL GRIFFITHS, PH.D., L.R.C.P., L.R.C.S. EDIN.

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FEW will controvert the statement that the present system of medical education, to say nothing of examination, is faulty in the extreme, and by no means calculated to ensure a generation of competent practitioners. Happily, this fact is gradually forcing itself on the attention of the teaching communities, and already there are signs of active reform. The whole tendency of the age is towards practical instruction, and it is hardly rash to prognosticate that ere this generation shall have passed away, the system of medical education will be entirely remodelled, and will be based on a foundation of practical work. Anatomy has ever been a practical study; for some time past students have been brought into the chemical laboratory, and have been enabled to trace out for themselves the truths of chemical science as applied to medicine; physiological laboratories are now being instituted in connection with our Universities and schools, and the broad outlines of practical clinical medicine are now being inculcated by competent demonstrators in most of our great hospitals.1

I am persuaded that if we desire to elevate the character of the profession, and to ensure the adequate education of its members, we must seek to do so rather by improving our

¹ See a paper on "Preliminary Clinical Instruction," by the author, in the Dublin Journal of Medical Science for September 1872.

methods of instruction than by modifying the scope and nature of examination. Probably in the whole range of subjects which the student of medicine is expected to "make up" during his curriculum, there is not one so imperfectly taught as Therapeutics and the collateral subjects, Materia Medica and Pharmacy, and the Art of Prescription. As a rule, the instruction in all these subjects is entrusted to the care of one and the same gentleman, and, as a rule, the time allotted to him for conveying information relative to these by no means limited subjects, is the summer session of three months, during which time he delivers three lectures a week, each of an hour's duration. If it be contended that this is sufficient, as well might we aver that it is possible to convey a sufficient knowledge of Therapeutics, Materia Medica, Pharmacy, and the Art of Prescription in thirty-six hours.

There are few of us now-a-days who would concur in the opinion of Radcliffe that "the whole art of physic might be written on one sheet of paper," and yet there is as much sense in this assertion as that the great science of Therapeutics and its allied subjects are adequately taught as at present.

Materia Medica, so called, embraces four distinct subjects, viz:—

- 1. Materia Medica proper.
- 2. Pharmacy.
- 3. Therapeutics and the physiological action of drugs.
- 4. The Art of Prescription.

I believe that it would conduce to the efficient study of these different branches of Materia Medica if they were taught in the order I have here indicated.

Materia Medica proper might be taught during the second winter session, when the student had sufficiently mastered Chemistry and Botany as applied to this subject. I conceive that such matters as the mode of preparation of sulphuric acid, or the characters of the order Papaveraceæ, and so forth, would be more appropriately treated of by the teachers of Chemistry and Botany respectively; and yet I have known lecturers on Materia Medica who would unhesitatingly devote one of their thirty-six lectures to the consideration of some such subject. The chemistry of the Materia Medica should form a legitimate part

of the chemical course, and the course on Botany should also have special reference to the Materia Medica. I would therefore exclude from the course of instruction in Materia Medica all superfluous chemical and botanical details—not that I undervalue these, but that I believe they would be better and more conveniently taught by the appointed teachers of these sciences.

The course of Materia Medica proper should embrace the recognition of drugs, the prominent characters of them, their geographical distribution, their adulterations and the mode of detection of these, and the enumeration of their pharmacopæial preparations. Now, this instruction should be practical. In my own classes I employ bottles, each containing a typical specimen, and having on one side a label with the requisite information printed thereon. These specimens each student handles and examines for himself, he sees the pharmacopæial preparations of each drug, and adulterated specimens are subjected to tests in his presence.

Pharmacy might be taught during the summer session succeeding the winter session which had been devoted to Materia Medica. In this case I would suggest that the student should be practically instructed in the mode of preparation and in the strengths of the pharmacopæial compounds.

It is, however, to the teaching of Therapeutics and the physiological action of drugs that I chiefly desire to refer. The importance of this department of Materia Medica cannot be overestimated. It is preposterous to assert that the requirements of medicine in this wise can be satisfied by a few sentences tacked on to a prosy account of the botanical and chemical characters of a drug. It is incontrovertible that in this country we are lamentably behindhand in our method of teaching Therapeutics, and that we suffer by comparison with the continental centres of medical education. In the latter, in Paris, Berlin, Vienna, in nearly every continental school of medicine, the means for prosecuting the study of Therapeutics are ample, and every encouragement is offered for the prosecution of this branch of medical science. Extensive laboratories exist, replete with every appliance for practical research; men of the highest order of intelligence and of the highest scientific culture are to be found devoting their talents and energies to the elucidation of therapeutical phenomena; the study of the physiological action of drugs is deemed to be one worthy of such as Bordier, Dujardin-Beaumetz, Gubler, Labbee, and Rabuteau; therapeutical societies abound, and original research is prosecuted with vigour and with brilliantly successful results.

Our countrymen are not deficient in the qualities essential for original investigation, and wherever therapeutical science is cultivated, the names of Anstie, Crum-Brown, Brunton, Fraser, Harley, and a host of others will be known. It redounds to the honour of this country that her sons, considering the disadvantageous circumstances under which they labour, have contributed so much to the furtherance of a knowledge of Therapeutics; but if so much has been achieved as matters are, would we not be justified in the hope that England would hold a yet more honourable place if within her realms the teaching of the science of Therapeutics were elevated to its proper sphere? Of late years, indeed, there are signs that the mind of the profession is awakening in this respect: for instance, a noteworthy feature in modern text-books is the introduction of information respecting the physiological action of drugs-a subject which until recently was simply ignored.

If we desire to combat the scepticism which we know to be rife in the ranks of the profession regarding the efficacy of drugs in the treatment of disease, it is incontestable that we must remodel our system of teaching therapeutical science. opinion that it should be studied during the last session of the curriculum. As to the manner of teaching it, I would substitute for the recitation of a string of dry didactic sentences, which are no sooner uttered than forgotten, a thoroughly practical system of laboratory work. The physiological action of drugs on the animal economy should be practically demonstrated on the lower animals as far as possible, and the suggestion of Hahnemann, Störck, and others, to search out the real action of remedial agents by proving them on the healthy human system, should be carried out by the students under proper and responsible direc-We shall probably be told that deductions from experiments with drugs on the lower animals may be fallacious, for that pigeons and goats, for instance, are remarkably insusceptible to the toxic action of opium, while rabbits may be fed on the

leaves of some of the most deadly solanaceous plants. This is so; but we reply that were it not for experimentation on the lower animals, some of the most brilliant therapeutic truths would still be entombed in the abyss of human ignorance.

Finally, in reply to the question as to whether the Art of Prescription is efficiently taught in this country, I would say, take any average fourth year's student and require him to indite a prescription: the result will probably justify us in deciding in the negative. As a rule, ignorance of the form of prescription, of the principles of medicinal combination, and of the laws of incompatibility, will be glaringly manifest.

In conclusion, I would earnestly be peak for Therapeutics and its allied subjects a more prominent place in the system of medical education. Of what avail is a knowledge of diseased action? How will the ability to pronounce a refined and accurate diagnosis profit us if we neglect to equip ourselves with the means which an all-wise Providence has placed within our reach of practising "the healing art?"

¹ See the author's "Lessons on Prescriptions and the Art of Prescribing," now publishing in the *Medical Press and Circular*.

THE INFLUENCE OF THE NERVOUS SYSTEM AND OF ARSENIC UPON THE NUTRITION OF THE SKIN.

BY DR. CLIFFORD ALLBUTT.

THOSE of us who attended lectures on Physiology some twenty years ago will remember how clearly and decidedly we were taught that nutrition is essentially independent of a nervous system. In support of this saying we were referred to the whole army of plants, to a multitude of simple animals, and to a few tissues in the human body itself. A few years later, however, made it manifest that independent as nutrition may essentially De, the control which a nervous system gains over it in the righer grades of life is nevertheless so great as to make its original reedom a somewhat barren truth for the student of the higher rganisms. Soon we began to hear even of trophic nerves, and t the present time we are tempted to exclaim that all tissues re but elaborated nerve endings. Be this as it may, we have arnt that in the higher animals nerve changes constantly ecede changes of other tissues, not only in normal function in normal growth, but also in abnormal function and in formal growth. Perhaps there is no more striking instance he results of withdrawing nervous influence from the tissues, the case of nerving for navicular disease. The section of nerve in the horse is followed, not by insensibility alone, but change in the nutrition of that part of the skin known as The nutrition of the hoof is so far deteriorated that rved horses the hoof, if submitted to any unusual strain, uncommonly dragged off the foot, and the horse will go d upon the bared stump unconscious of pain. If the hoof should not be shed and the nerving be effectual, the whole of the tissues of the fetlock and foot below the section degenerate; they lose their definite structural characters, they become puffy and friable, and ultimately, losing their histological features and their tenacity, pass into a quasi-gelatinous condition. Such are the effects of cutting off all nerve supply from a set of tissues: and other instances might be adduced to illustrate the effects of a partial withdrawal of nerve influence in deteriorating or of irritation of nerves in preventing the growth and nutrition of Such chains of action are perhaps far commoner in the body than is supposed. The effects of long-continued mental anxiety upon nutrition are well known, and I think I have found this to be a commoner cause of that state in which the granular kidney is a chief feature than the alcohol to which it is so often In a forthcoming volume of the "West Riding Asylum Reports," I hope to consider carefully the other pathological changes which accompany the various kinds of chronic nervous disease. In this way we may arrive at a natural classification of mental insanities, which will replace the present vain endeavours to classify them according to mere superficial similarities. In this paper I desire only to insist once more upon the clinical facts which seem to me to prove that in a large number of skin affections the nervous supply of the skin is primarily at fault; that not zona alone, not frontal herpes alone, but many forms of acne, eczema, psoriasis, lichen, and urticaria are closely bound up with nervous conditions. I have urged repeatedly for many years,2 and every year seems to make it more probable that this is true both of these and of many rarer kinds of change, such as vitiligo or morphæa. Leaving the latter, however, and confining our attention to the common skin affections, I would impress upon the reader that these are very commonly associated with phenomena which point to a nervous origin, though in many cases, no doubt, their causation is to be explained in other ways. Let us take acne, for example, and a hundred instances will remind us of its curious connection with sexual changes and tendencies,

² Vide St. George's Hospital Reports, volume for 1867, and Liverpool and Manchester Reports, 1871.

¹ I have to thank Mr. Fearnley, formerly of Leeds, a very able veterinary surgeon, for the opportunity of examining limbs in this condition.

and with the use of bromide of potassium. Eczema, lichen, psoriasis and urticaria seem rather to be associated with visceral neuroses in other than sexual parts, and with asthma and gastralgia more especially. Asthmatics and gastralgics are also sufferers from facial and other superficial neuralgias, and thus facial neuralgia and migraine are often connected with the cutaneous changes; but I do think that the cutaneous changes are less frequent in persons in whom facial or migrainous neuralgias have occurred alone, or unassociated with pneumogastric neuralgias. Why this is I cannot say.

I have said that I do not by any means assert that all eczemas, all psoriases, all lichens, all urticarias are cutaneous neuroses. On the contrary, some forms of some of these are often seen in gouty persons and may well depend upon irritative elements in the circulation. Or, again, such skin affections may own other and obscurer origins. The interesting question therefore arises whether eczema as a cutaneous neurosis presents any external features by which it may be distinguished from eczema which is due to other causes; and so again of lichen, urticaria, and psoriasis, whether the eye may discern in them any differences corresponding to differences of causation. We hear it often said, and thoughtlessly repeated, that symmetrical disposition on the two sides of the body is an evidence of an origin from the blood, but surely such disposition speaks at least as strongly in favour of dependence upon the nervous system. Excessive irritability of the affected parts again suggests a morbid innervation, and such eruptions may be compared with the syphilitic, which probably follow other than nervous antecedents, and which rarely give rise to itching or tingling.

If we turn from speculation to clinical experience, I believe that we shall find the cutaneous affections of neurotics to be symmetrical and to be irritable. Moreover, symmetrical irritable eruptions are often spreading eruptions, and are generally coincident, indeed, with the class of affections called dartrous by the more discriminating of the French physicians. The dartrous eruptions, then, seem to be cutaneous neuroses, or to partake of that character, and are not primarily due to imperfect excretion. Let us turn now to another curious piece of clinical evidence. The metal arsenic, like its analogue phosphorus, is one of the

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most useful neurotic remedies which we possess; it is especially useful in asthma and gastralgia, and it is not without some value in chorea and other neuroses. On the other hand, arsenic has long been known by physicians to have great curative power in certain affections of the skin, though it has been and is still regarded as an agent of uncertain or irregular efficacy. arsenic in my hands has been certainly and regularly efficacious in those skin diseases which on other grounds I referred, or was disposed to refer, to the class of cutaneous neuroses, while in ther skin affections it has been inert or injurious. Here, then, we have another curious bond between affections apparently remote, between asthma and gastralgia on the one hand and many skin affections on the other. Does not this strongly suggest to us a community of origin? In support of these views I will append the heads of eighteen cases which have all occurred in my private practice during the last eighteen months. Many like cases of earlier date have already been published in my previous papers on this subject.

- 1. Mrs. A., sent by Mr. Rayner, of Birstall. A neurotic all her life. Has suffered much from gastralgia and tic of head and face. Has eczema behind both ears.
- 2. Mr. —, sent by Mr. Fowler, of Wakefield. For some years has had eczema on both arms, and is liable to frightful gastralgia.
- 3. Mrs. B., wife of a medical man. Had obstinate and severe gastralgia eight years ago, and now has extreme nervous depression and paræsthesia. Has a severe lichen in neck and back.
- 4. Miss H., aged 9. Mother delicate and has gastralgia. Brother has wetted his bed up to his present age (eight years). She has chorea and psoriasis.
- 5. Miss E. H., aged 37. Tic frequently for many years. Urticaria very severe and obstinate in 1872. Now consults me for severe gastralgia.
- 6. Mr. C. Had extensive itching pityriasis in Oct. 1871. He was cured at once by arsenic. At subsequent dates he has been under my care for many and varied nervous ailments.
- 7. Mrs. K., patient of Mr. Watts, Dewsbury. Migraine from childhood. Facial neuralgia frequent. One attack of cervico-brachial neuralgia. Consulted me for recurring severe gastralgia.

Has had four attacks of eczema. All her affections were wonderfully relieved by arsenic.

- 8. Mrs. C., wife of a medical man. Liable to very severe spasmodic asthma and gastralgia; also to intense intercostal neuralgia. Has in former years been subject to eczema.
- 9. Mrs. K. Consulted me in Oct. 1872, for eczema narium and aurium. Rapidly improved on arsenic. In 1873, had prolonged, recurring and severe attacks of an obscure abdominal neuralgia.
- 10. Mrs. H. Belongs to a highly neurotic family. Is liable to intense migraine and to gastralgia. Is a "terrible martyr to urticaria."
- 11. Miss C. Consulted me, in 1873, for obstinate neuralgia, superficial and visceral. Her brother came to me a few months later, complaining of a curious and obstinate form of urticaria. He is himself of very nervous temperament, and has migraine.
- 12. Mr. L. A great sufferer from neuralgia. Very subject also to eczema over arms, legs, and trunk.
- 13. Mrs. C., patient of Mr. Robinson, of Huddersfield. Came to me with a curious form of skin affection partaking of the characters of pemphigus and of rupia. She has cardiac neuroses, including great intermittence of pulse, gastralgia, and intercostal pains for two years. History points strongly to neurosis.
- 14. Mr. H. Himself has spasmodic asthma. His mother is very neuralgic, and his brother subsequently came to me with eczema.
- 15. Miss H. Belongs to a highly nervous family, and herself has much tic and migraine. Has psoriasis on elbows, knees, &c.
- 16. Mrs. S. Has spasmodic asthma and urticaria. Two of her children have eczema.
- 17. Miss H. A., aged 24. Has been subject to epilepsy for several years. For last ten or twelve months has had eczema of legs.
- 18. Mr. S., sent by Mr. Richardson, of Leeds. Has obstinate recurring eczema of hands and legs. Is of nervous temperament. Family odd and eccentric. Brother has epileptic fits.

I have not often seen skin affections in marked association with epilepsy, but I remember one case well in which psoriasis and epilepsy occurred in the same person, and in which arsenicured both or greatly relieved them.

NEUROTIC MEDICINES; WITH SPECIAL REFERENCE TO CAMPHOR AND ITS MONOBROMIDE

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THERE is no department in the whole range of medicine which throughout its history has been more ostensibly practical and practically more formulary than the domain of Therapeutics. Its vocabulary consists principally of terms which, if by their bulk they give promise of being pregnant with meaning, are found on examination to yield little more than vox et præteres Words expressing the most general ideas, specifying the result of medication, and throwing no light upon the mode or origin of action, occur more commonly in this department of science than in any other, and sometimes have a certain influence in retarding the progress of rational therapeutics. ear, satisfied with the sound of a euphonious title, deludes the mind and cozens it into a state of false satisfaction, when reason should see how little meaning may remain in terms which at first perhaps were the expression of a mistaken notion, and which may have lost much of their original meaning by long and unceremonious transit through time. That this great imperfection should exist in the language of therapeutics is dependent upon several causes. Early ignorance of the most essential points of physiology, and early speculations regarding the philosophy of the body, led to a nomenclature of therapeutics adapted to wild theories regarding vital processes. The impossibility of administering medicines on any but the most arbitrary and empiric principles rendered it impossible for the most prudent of the early physicians to judge of the action of a medicine in

any way but by results. And even though the early masters in medicine had possessed a more complete knowledge of internal states than they did, it would have been exceedingly difficult for them to come to any clear determination upon the modus operandi of many drugs. Ancient physicians, by their history and by the nature of their social surroundings, were to a marked Their words were waited for and grasped extent oracular. with all the avidity of an untutored faith. To them, therefore, it would have been a task of considerable difficulty to determine, amidst the influences of subjective imagination and the objective evidence of their patients, how much of a certain action was due to a given drug as a means of detecting how that action was induced. Owing to this method of judging medicines and classifying them by results, drugs which have a marked effect on the nervous system being, so to speak, diagrammatic in their action, attracted early attention. Mention is made of them in the earliest classic literature. Such agents as could soothe bodily and mental irritability, remove pain, procure sleep. and deaden for a time the acuteness of sensory impressions, could not fail to secure early and favourable notice. And though the number of medicines suitable for inducing such conditions has been constantly on the increase, it is astonishing how little more is known regarding the nature of their actions than was known when the existence of such a principle of action was first determined, and when, for want of clearer knowledge, men were compelled to give these medicines such names as narcotics, sedatives, anti-spasmodics, &c., or the titles of which these are translations.

The present state of our knowledge of the manner in which most of the functions of the nervous system are executed, and the imperfect insight which we can command into the histological changes accompanying many of the most constant physiological acts in nerve-centres, render it almost impossible to speak with any approach to certainty regarding the method in which artificial changes are induced in them by drugs.

Both chemical and mechanical theories have been advanced for the purpose of explaining the alterations in function which nerves and nerve-centres manifest under medication, but even the authors of such speculations can claim little more for them than a passing approval of scientific ingenuity. Liebig advanced a theory that such neurotic drugs as alcohol acted by depriving the tissues of part of the oxygen necessary for their own inherent chemical changes, and consequently diminishing vitality and modifying the activity of the tissues affected. Dr. Snow propounded a speculation tinged with the chemical pathology of Dr. Bence Jones. He held that such drugs as chloroform, ether, alcohol, &c., deranged the histological changes and functional activity of the tissues in the same manner as they retard combustion and oxidation outside the body when they are combined in certain proportions with the atmospheric air. Dr. Headland believes in "the bare possibility of the operations of neurotic agents being explicable on mechanical grounds." Each particle of a compound body is premised by him to be made up of a number of indivisible atoms of inappreciable minuteness. Owing to the peculiar chemical constitution of these compound bodies, each of their ultimate parts must consist of a definite arrangement of simple atoms, peculiar in shape, and in that respect differing to some extent from every other compound "Both the substance of a nerve and the active part of a nerve medicine consist of a number of definite compounds. And it is possible that the atom of a stimulant medicine may be of such a shape as that it shall be unable to coincide with or to fit into the series of atoms forming the sensitive surface of the nerve, and thus irritate this when brought into contact with it; and that the compound atoms of a sedative may so arrange with these nerve particles as to fit among and extinguish the salient points and annihilate their natural sensibility." Dr. Headland points out, in corroboration of this view, how impulses, and especially minute and inappreciable impulses of a mechanical kind, influence the nerves, as manifested by the phenomena of the senses; and refers to the observation that substances which are chemically alike are in general similar in their action on nerves. However far from or near to the proper explanation of the action of nervines these theories may be, a more evident observation confronts one when entering on this complex subject. the intimate nature of the action of narcotics, sedatives, and stimulants may be, there can be no doubt that the accomplished result bears a strong resemblance to corresponding conditions in nature. Medicines of the first class produce a temporary

suppression of volition and of all intellectual activity, and a withdrawal from sensory impressions corresponding to the condition of natural sleep. Sedatives induce an artificial suppression of hyperæsthetic conditions, and establish a state analogous to healthy, unconscious repose without sleep. Stimulants, acting as a substitute for rest and renewal of tissue, raise the depressed nervous structures to a feeling and condition which has its prototype in the vigour of the system when physiologically renovated for renewed exercise of energy. Even the delirium produced by certain members of the narcotic class has a limited analogy to the natural state of the mind in dreams. And if science is not sufficiently advanced to determine what changes in the nervous system lead to these several physiological conditions, it is not probable that any very satisfactory evidence will as yet be advanced bearing upon the states which are their artificial analogues. If the state of the brain in natural sleep is as yet only imperfectly determined, it is difficult to see how the actions of opium in inducing such a state artificially can be demonstrated. All that can be said is, that the presence of opium in the blood and in the cerebral tissues produces a condition of the brain which, while the drug remains in the blood and in the tissues in sufficient quantity, is probably identical with the state of the brain in sleep. Again, if the condition of the tissue and the blood-supply of nerve-centres and ganglia in such diseases as hysteria and chorea are imperfectly known, it is scarcely possible to determine what histological and dynamic changes occur during the administration of such sedatives as will produce a condition analogous to complete repose. One thing may, however, be observed, namely, that some medicines influence such parts of the nervous system as are subservient to organic life, as a primary and ultimate action, while others influence primarily the phenomena of intellectual life, and secondarily act as sedatives or stimulants to the nerve-centres and distribution subservient to organic existence. division it becomes evident that a therapeutic argument is added to the evidence of physiology and pathology, showing that intellectual life and organic life are under the control of, or at least dependent for their manifestation upon, different parts of the nervous system. At the same time it will be observed that in

the great majority of cases where narcotic medicines are useful, they are principally employed in controlling some excitement or in modifying some depression due to primary derangement in the vascular system or induced by some near or distant irritation. The pathological changes in the histology of nerves and nervecentres, even in the most marked varieties of central nervous disease, are so intricate and so liable to variation that it is difficult to direct the apeutic measures to the rectification of pathological states of central nerve-tissue with any prospect of lasting benefit. As a consequence, stress requires to be placed on the determination of those changes in the blood and bloodvessels, on those alterations in the function of the sympathetic system, and those modifications of the general tissue nutrition which so frequently induce central nervous effects which are sometimes controlled, but more frequently repressed, by so-called "nervines."

By this method of correcting nervous disorders through acting on the accessory systems, new methods are determined of subduing excitement and soothing irritation by means of substances which appear to act almost, if not altogether, exclusively, in such a way as to alter the condition of the bloodsupply to deranged centres. In this manner ergot of rye, by leading to the contraction of involuntary muscular tissue, is seen to have an effect not only in inducing the action of the uterine fibres, but in inducing a similar action in the arterial muscular structures, which in its turn leads to the control of the bloodsupply in such parts of the central nervous system as manifest symptoms of excitement. Thus it is highly efficacious in the treatment of such forms of disease as recurrent mania, epilepsy with hyperæmia, and such other cerebral and spinal states as are characterised by fluctuating conditions in the amount of the blood-supply and the tonicity of the vessels. bromide of potassium, also diminishing the calibre of the vessels, possesses a great power in rectifying such states as are frequently induced in the nervous system through over-exercise of its centres, either by study, by dissipation, or by convulsive seizures. The rectification of changes in the quality and quantity of the blood, such as are found in chlorosis, anæmia, metallic poisoning, and similar conditions, is of course a very frequent means of

subduing morbid excitement in the nerve-centres. But there is a more complex group of cases where there appears to be a complete change in the excitability of the whole of the nervecentres; where derangement of the sensory, motor, vaso-motor. and not unfrequently even the psychical centres, mutually intensified, and preceded or accompanied by a disorder of almost all the organic functions, manifests itself in prominent symptoms. Hysteria may be looked upon as the type of such states; but in less marked forms they appear in such cases of hyperæsthetic derangement as are induced by excesses, by prolonged study, or by such diathetic conditions, for instance, as give rise to oxaluria. Such cases all point to the probability of an early involvement of the vaso-motor system in their The marked self-consciousness, the quickened pulse and irritable heart, the derangement of the whole track supplied by the sympathetic and the vagus, the sudden response to all forms of reflex excitement, the impairment of the blood, and the marked alteration in the irritability of the ganglionic and cerebral centres, show the existence of a condition of which primary derangement of the system controlling tissue-nutrition must be an early element. With the exception of pure diathetic forms amenable to diathetic treatment, the medicines which have been successfully employed in such states are divided into two great classes, which at first seem to be of totally opposite action. The first is the group of resinous exudations like assafeetida, and anti-spasmodic stimulants like valerian, aided or not by diffusible excitants like ammonia or ether. The second consists of sedatives with a peculiar action on the vessels, such as bromide of potassium, camphor, &c. And supplementary to these, but not primarily or in any way directly neurotic medicines, are those which rectify the state of the blood, the impairment of which may have been the proximate cause of The paradox which may be supposed to nervous disorder. exist in the effects produced by these two opposite groups of medicines disappears on close investigation. Excitement of the nerve-centres mainly dependent upon alterations in quantity and quality of blood, and on modifications in the tonicity of vessels, but to some extent due also to molecular or other obscure changes in the nerve-tissue itself, is amenable to two

kinds of curative action dependent on the complexity of the derangement. In the first place, altered conditions of nutrition have modified the trophic state of the centres to such an extent as to excite most probably a greater activity of reflex In the second place, the blood exists in such an impaired condition as to act to some extent as a foreign body would act in producing irritation. So that two methods of treatment are suitable for rectifying a transient condition of excitement. Either the nerve-centres may be roused to the exercise of a normal functional activity by diffusible stimulants, or movements indicative of enfeeblement in the centres may be controlled by substances adapted for the evolvement of nerve-force, just as the drunkard's tremulous arm may be steadied by the administration of a morning allowance The stimulant in its primary action supplies of stimulant. an artificial power to the deranged centres, and in its secondary depression, as well as by virtue of the supply of a new element of nervous control, the circulation becomes subdued, and the centres profit by both stages of the action of the stimulant. In the sedative method of treatment this secondary condition Bromide of potassium, appears to be established at once. causing direct contraction of the small vessels, regulates the supply of blood in a more equable manner, brings the vasomotor system into a condition of more healthy activity, and tends, by inducing a more healthy nutrition of centres, to establish a condition characterised by functional integrity. In the supplementary class of medicines the action is exerted in the blood, which by the careful supply of metallic substances is raised to a standard requisite for the maintenance of nervetissue and of the necessary tonicity of the vascular walls. In such cases also as those in which substances like chloral, or chloral in combination with bromide of potassium, are given to the extent of producing sleep, the nerve-centres are, so to speak, drawn altogether from the contest with irritating vascular and inherent conditions, and are led by repose to acquire such new permanent strength as a stimulant could only temporarily have imparted to them. It appears that the general opinion which has been long entertained about such substances as camphor is, that they play a part very similar to that referred to above

as enacted by bromide of potassium. Camphor has been vaguely regarded as possessing capabilities of subduing irritation of the nervous system following upon exhaustion, or dependent either upon altered nutrition of nerve-texture or upon changes in the blood-pressure and blood-supply which may be regarded as not unfrequently following upon general disorder of the vaso-motor system. Perhaps it was some such idea regarding the resemblance of the action ascribed to camphor, and that demonstrated as being potential in bromide of potassium, that led Deneffe and others to try the action of a bromide of camphor with a view to determining its value in general and special nervous irritations. And this leads me to treat of the second part of my subject, namely, the consideration of camphor and its monobromide.

Camphor is a drug which, throughout the long history of its use in medicine,1 has both lost and gained reputation by its almost invariable association with substances of independent and known activity. By its presence in so many of those prescriptions and standard combinations which may be called eclectic, it has gained in reputation by being placed in a position favourable for the assumption of a credit which, in many cases, is due to the more active bodies with which it is associated. It is highly probable also that its reputation has to some extent suffered by its general employment as an accessory, inasmuch as it has had fewer opportunities than most drugs, enjoying an equal amount of popularity, of manifesting its independent properties and actions. The general calmative result which is all but universally ascribed to it is almost to an equal extent regarded as one more venerable by tradition than attainable by experiment; at least, it is generally admitted that, in the quantities usually prescribed, no such action can be anticipated with anything like certainty. Again, in such special conditions as have been adduced by various observers as being suitable for the demonstration of the therapeutic virtues of camphor, the evidence on one side has almost always been sufficient to negative the statements advanced upon the other. In the delirium

¹ Camphor was employed in ancient Chinese medicine. It was used in Arabian medicine in the tenth, and by the later Greek school of physicians in the eleventh century.

of fevers, for instance, some have vaunted it as highly beneficial, while others have attacked it as almost ludicrously ineffectual. In the treatment of cholera, some have spoken of it as the only remedy requiring to be administered, while others have branded it as useless. As a prophylactic in epidemics, some have praised it with enthusiasm, and others have regarded it as absolutely inert, possessing no more protective value than an unblessed charm.

The undefined actions of camphor resemble very closely those which have been shown by Voisin, Burman, Vigouroux, Gubler, and others, to be the result of the administration of bromide of potassium—a sedative action on the medulla oblongata and spinal cord, and on the centres of organic life. In the vague notions which have been prevalent regarding its actions, it does not seem to have been suggested that camphor possesses any constrictive action on the small vessels, similar to that produced by the bromide. It is not at all improbable, however, that such a constriction may result from the administration of large doses of camphor. The production of a motor character in the radial pulse while a patient is under the influence of a fifteen or twentygrain dose, points to the probability of an increased tension and diminished calibre in the smaller tubes. If so, the action in both cases, as well as that which has been determined to follow on the administration of the monobromide of camphor, would point to the group as a class of medicines increasing the arterial pressure, and presumably acting upon the vagus. The relief which Graves assures us was found by him to result from the administration of camphor in the delirium of fevers could be explained by such a proposition. It is interesting to find that experiments directed towards determining the therapeutic actions of the monobromide of camphor show that the drug has a marked tendency towards the production of this change in arterial pressure.

In the *Practitioner* for August last, Dr. Bourneville published the results of his investigations regarding the physiological and therapeutical actions of monobromide of camphor, gave in detail the description of numerous experiments on animals, and recorded the effects produced by the monobromide when administered to patients in delirium tremens, infantile convul-

sions, &c. Dr. Bourneville determined that the drug possessed peculiar hypnotic properties, and that it acted principally on the cerebral nervous system. He showed that physiologically it lowered numerically both pulsation and respiration, and caused a steady decline in the temperature. He also found that in rabbits it caused contraction of the vessels of the ears and eyelids.

With the intention of supplementing Dr. Bourneville's pains-taking experiments, by ascertaining the effect produced by the administration of monobromide of camphor in several forms of brain-disease with excitement, I procured a supply of the drug. I cannot say without limitation that my observations have been confirmatory of those recorded by Dr. Bourneville; but the altered conditions for experiment, and contingencies dependent on the quality of the drug employed, may have biassed my results in a manner which subsequent research may rectify. Still, the physiological results obtained in observations made, both on men and the lower animals, differ not so much in kind as in extent from those of Dr. Bourneville.

Before entering upon the description of my observations, it may be advisable to consider how far camphor and its monobromide would be useful in medical practice if experimentally demonstrated to have certain precise actions. To begin with, it must be observed that the very limited solubility which characterises camphor is present to even a more marked extent in its monobromide. Not only so, but the high diffusive power which in camphor appears to compensate, in some measure, for its meagre solubility, seems to be much less characteristic of the monobromide. In sufficient quantities for the production of any marked result, camphor cannot be dissolved so as to remain in solution and be at the same time sufficiently bland for administration in anything but milk, and milk is a most inconvenient In pills it is so bulky that scarcely dispensing medium. more than two grains can be given in each, so that eight or ten pills require to be administered in a dose before much physiological effect can be looked for. Though an enthusiastic experimentalist might find no difficulty in overcoming the nausea which physic, quite as much in the abstract as the concrete, generally creates, and in swallowing ten large pills in succession, the performance would not recommend itself to a

patient with a diminished appetite and a fastidious palate. Again: in mucilage, or in oils and fats, the drug would become most uninviting, and would most probably be rejected either before or after an attempt at deglutition. The same objections apply equally to the monobromide of camphor. In fact, it appears to me that in the case of the new drug they are intensified. The solubility of the monobromide in spirit is much less than that of the pure camphor; and as the monobromide is at once precipitated in an artificial gastric juice, there is every reason to believe that in any mode of administration it assumes the undissolved form in the stomach. Consequently, it must produce all those bad effects upon the mucous membranes which have been ascribed to camphor. With a candour which shows his desire to reach the truth, Dr. Bourneville admits that it does so when he concludes that "the monobromide of camphor brings on in guinea-pigs and in cats a loss of flesh which, when the experimentation is carried on, soon occasions, in turn, a fatal termination."

Also with regard to hypodermic injection, it must be observed as an important matter when determining the practical utility of the drug, that the marked insolubility of the monobronide of camphor renders it necessary to use so pungent an injection, and to make so many punctures, that unless some new, bland solvent can be discovered for it, its use in medical practice must be deferred. Though I have not seen a single sign of suppurative or erysipelatous inflammation from the use of the injection prepared according to Dr. Bourneville's formula (and I have made fifteen consecutive hypodermic injections into one animal), yet it would be impracticable to use a hypodermic injection of a pungent character, of which several and perhaps numerous consecutive new insertions would be demanded before any beneficial result could be hopefully expected.

What follows upon the administration of large doses of monobromide of camphor by the stomach? I administered five pills containing each two grains of monobromide of camphor to an adult, in unexceptional health, except for the presence of slight functional cardiac irritability, which with him is a constant condition. The ten-grain dose was taken at 2.30 P.M. after a meal. Before exhibition of the mono-

bromide the pulse was 96, the temperature 99.3°, and the respirations were 19 per minute. In one hour the pulse had fallen to 70; at the end of the second hour it stood at 74, and in another hour had returned to its normal index. During the course of the three hours the respirations were reduced one per minute, and the temperature fell 1°. On the succeeding evening a larger dose was given. At 8 P.M., some time after a meal, four pills of four grains each were administered. The pulse, to begin with, was 96, respiration 18, temperature 99°. At 8 P.M. the pulse was unchanged, the respirations were reduced to 16, and the temperature had fallen half a degree. An hour later the pulse was 86, the temperature 99°, and the respirations 17. In another hour all were normal. Throughout the whole time there was no hypnotic tendency, neither was there pain in any part of the body. The head remained clear, and the condition was one of general comfort. resolved still to increase the dose, and administered five pills of four grains each. It was during the afternoon, and shortly after a meal. Pulse 96, respirations 20, temperature 99.2°. In an hour the pulse was reduced to 80, in another hour to 78, and at the expiration of the next hour had returned to the starting point. The respirations and temperature were reduced in the same ratio as before. It will be seen that in the first and second of these observations the pulse was decidedly reduced by the use of the monobromide of camphor. In the second experiment the reduction was less marked. Some explanation may be found of this divergence in the fact that as in the first and third cases the drug was taken very soon after a meal, the process of digestion favoured the absorption and diffusion of the medicine, and that as in the second instance the stomach was inactive when the medicine was administered, much of it may have passed through the canal unabsorbed. I was led after these observations to try what would be the corresponding effects of large doses of camphor alone, and found that the result was very similar. Shortly after a meal I administered ten grains of camphor. Before the exhibition of the medicine the pulse was 96, the temperature 99.6°, the respirations 20. In an hour the pulse was reduced to 92, in two hours to 70, and in three hours had reached 74, in an upward progress which soon reached the starting point. On injecting a rabbit, however, with ten grains of camphor in solution, the depression was not so strongly marked, though a considerable fall did occur. In both cases there was a fall of respiration and temperature, but in the case of the rabbit this was soon followed by a rise of both, more marked in the instance of the temperature, which was raised 2° beyond the average of two or three days. There can be little or no doubt that the combination with camphor of so large a quantity of bromine must affect the physiological actions of the former, but the comparative observation requires further research. In another experiment, four grains of monobromide of camphor injected hypodermically into a rabbit reduced the pulsations twenty beats, but did not affect the temperature. After the injection the rabbit was very lethargic, did not move on stimulation, but allowed itself to be shoved along the floor. To another rabbit, weighing 1,543 grammes, ten grains of monobromide of camphor were administered hypodermically. In three hours the pulse was reduced from 178 to 150 beats. The respirations were diminished by 18 per minute, and the temperature fell about 1°. In order to determine the poisonous dose of my preparation I injected 15 grains into another rabbit. The pulse descended from 150 to nearly half that number of beats in the course of an hour. At the same time the respirations were diminished by more than one-half, and the temperature fell Other rabbits were similarly treated, with similar results. In none of these cases except one was there any hypnotic symptom. In several there was stupor, lasting for about a In none were the pupils altered. quarter of an hour.

Though these experiments are only partially confirmatory of Dr. Bourneville's, yet they indicate their correctness, and as it required larger quantities of my monobromide to produce simple depression than those employed by Dr. Bourneville, the natural inference is that my preparation was faulty. As, however, Dr. Crichton Browne has kindly ordered for me a new sample to be specially made by Messrs. Smith, of Edinburgh, I hope to have an opportunity of completing my observations. With regard to the administration of the drug in brain diseases, I found some difficulty in getting patients to swallow the medicine in sufficient quantity for the pro-

duction of any marked result. In one case of chronic mania the patient became rapidly worse under its use; but as she was very subject to severe exacerbations of her continuous excitement, the circumstance can only be regarded as fortuitous. In one case of hysterical mania which appeared to me to be very suitable, I administered 12 grains of the monobromide daily. The pulse was very soon reduced from 110 to 95, and her symptoms were much toned down. She became quieter and less erratic, but suddenly she got hold of the notion that she was being experimented on, and her excitement was recalled by the idea. In another case, one of monomania, though the pulse was soon reduced about twenty beats, the mental symp toms were not relieved; while in a case of recurrent mania the pulse rose suddenly from 100 to 120 under the use of the drug, without any physical condition to account for the rise.

With regard to the administration of camphor and its monobromide, it must be observed that in the cases in which these substances were given to an adult in large doses by the stomach. severe gastric catarrh followed and lasted for about a fortnight. In the cases referred to, this condition may have been intensified, if not induced, by the administration of a 16-grain dose of the monobromide on an empty stomach. It is doubtful, however, whether either camphor or its monobromide will ever be favourite medicines, owing to their limited solubility, unless some means should be devised of introducing them into the stomach in a manner calculated to lessen their tendency to produce gastric irritation. Dragées, such as Dr. Bourneville refers to, are elegant preparations, but as far as the tendency to irritation is concerned they have no advantage over pills, and I am afraid that for hypodermic injection a more concentrated and more bland solution will require to be devised before the monobromide can come into general use. Still, the preparation is one which possesses a value which will reward any reasonable amount of ingenuity which may be expended in determining convenient methods of administering it.

NO. LXXVII. Z

A SUCCESSFUL CASE OF TRAUMATIC TETANUS TREATED BY LARGE DOSES OF CALABAR BEAN.

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College Hospital.

I AM induced to publish this case on account of the very large doses of Calabar bean that were administered, the irregular course of the symptoms, and the successful result.

On the evening of the 12th of September I received a letter from Dr. O'Leary, Professor of Materia Medica and Therapeutics and of Forensic Medicine at the University of Cork, then staying in London, saying that he feared he was attacked with traumatic tetanus, and requesting my prompt attendance. Dr. O'Leary told me he had been ill in bed three days; that six weeks previous he was thrown from his horse whilst riding & steeplechase at Punchtown, and inflicted a wound on his leg, which formed an obstinate ulcer, which he irritated a few days before his illness by pulling on riding breeches, to try a horse at Alexandra Palace Horse Show. There was an oval ulcer about two inches long and one-and-a-half broad, on the left leg, which Dr. O'Leary was dressing with "phenilonitric" acid Whilst examining the leg several of its muscles became for a few seconds rigidly contracted, and then they became relaxed; then in a few seconds the muscle of the right thigh became affected, and even the muscles of both legs. Similar attacks occurred every few seconds, affecting sometimes only a few, at other times involving most of the muscles of the legs. The abdominal muscles were much more rarely and far less severely

affected, and those of the neck occasionally felt stiff. upper extremities, chest and jaws, were unaffected. Dr. O'Leary protruded his tongue and swallowed readily, and without producing any tetanic contractions. The spasms were not brought on by external irritation, for they were not produced by irritating the limb, nor by that of getting out of bed. His pulse was feeble, and beat 120 per minute. The breathing was calm. I ordered him 30 grains of chloral and 10 of laudanum. Next morning, the fourth day of illness, I found him much worse. He had had no sleep. The spasms, now frequently recurring, involved his arms. During an attack the muscles of the legs, abdomen, and arms became powerfully contracted, and the abdominal muscles were as hard as boards. The tetanic seizures only remitted, for on the decline of each paroxysm, more or less rigidity still remained. He complained of slight stiffness of the neck, but the muscles of the chest and jaw remained unaffected. He looked very anxious. I immediately ordered him 1 gr. of extract of physostigma every quarter of an hour by the mouth, and I may here say that throughout he took the medicine in this way. He commenced the medicine at 10 A.M., Sept. 13. His bowels were very freely open in the night. Sir James Paget kindly visited him with me, and was much struck by the irregular course of the disease.

At four in the afternoon, after taking about 5 grains of the extract, Dr. O'Leary was considerably better. The paroxysms were much less severe, and scarcely affected his arms, and between the attacks the leg muscles were quite flaccid; the attacks, in fact, had become intermittent instead of remittent. His expression was much less anxious, the skin moist and slightly perspiring, and his pulse beat 60.

At 10 P.M., having taken 10 grains of the extract in the twelve preceding hours, he was surprisingly better, the muscles being quite flaccid, and since last report he had undergone only one slight attack. He had taken plenty of food. His bowels were well open. P. 68, still small. He looked calm, and had slept about two hours, being roused every quarter of an hour for his medicine. The medicine had produced slight loss of power; his arms and legs, especially his legs, feeling rather heavy.

Sept. 14.—On this the second day of treatment, at 9 A.M., Sir James Paget again saw Dr. O'Leary with me. Last night he took 30 grains of chloral and 10 drops of laudanum, and 11 gr. of extract of Calabar bean every hour, making 20 grains of extract in nineteen hours. He slept well; has had no spasm since last report, so that with the exception of one slight attack he has been free from spasms for sixteen hours, and, indeed, he looks quite well, and feels neither sore nor bruised. There is no paralysis, not even a sensation of heaviness from the medicine. He was so well that we discontinued the drug.—8 P.M.: He has passed a capital day, having experienced only once or twice very slight attacks of rigidity of the hands, abdomen, and legs, on getting out of bed to pass water, and occasionally on moving his legs the muscles of the great toes became slightly tetanic. At bed-time he took 30 grains of chloral and 10 of laudanum.

Sept. 15.—At ten last night the paroxysms suddenly returned with terrible severity; the first attack producing complete opisthotonos, with jaws firmly fixed. The paroxysms occurred every few minutes, increasing in severity. They were so severe at 2 A.M. that the nurse several times thought he would have died from asphyxia. Unfortunately I was out of town, and could not see him till 10.30 A.M., and at this juncture Sir James Paget was obliged to leave town, so that I lost the advantage of his assistance. On the return of the paroxysms he recommenced the Calabar bean, a gr. every quarter of an When I saw my patient the medicine had produced hour. His paroxysms were terrible. His jaws were firmly no effect. During each attack his body was first strongly bent clenched. backwards, only his head and heels touching the bed; and then in a short time he became bent forwards, so that the chin would almost touch his knees; then his body was bent from side to side, and as the attack passed off his arms and legs twitched violently, as if excited by powerful galvanic shocks. These frightful attacks, with slight remissions every few minutes, would last twenty minutes to half an hour. Sometimes the breathing was arrested by tetanic contraction of the respiratory muscles, till he grew blue-black in the face, and several times I thought he would have died from asphyxia. The sterno-mastoids and other muscles of his neck stood out

prominently. There was well-marked risus sardonicus, and he looked very anxious. Even when the paroxysm passed off, the extremities and muscles of the abdomen remained rigid, and he could not turn his head in the slightest degree to either side, nor bend it forward. Strange to say, external agents seemed to have very little effect in producing the attacks, for I examined him carefully, and handled his limbs without bringing on a convulsion. He swallowed slowly and with some difficulty, and after several mouthfuls a paroxysm came Talking did not excite the convulsions. At 10.30 A.M. I gave him 2 of a grain of extract, and repeated this at 10.40 and 10.45, and then he took \frac{2}{3} gr. every quarter of an hour. The attacks continued to be very severe, lasting, with slight remissions, from a quarter of an hour to twenty minutes, but the interval between them increased. The attacks occurred at the following times: 11, 11.9, 11.25, 11.45, and 12.25. was in imminent danger of asphyxia, and on the decline of the paroxysm most of the muscles were in a state of tonic contraction. As it was evident that the medicine had not yet produced sufficient effect, at 12.45 I ordered 3 ss. of a mixture containing \(\frac{1}{3} \) gr. to 3 j, every quarter of an hour. At 2.45 a dose of the medicine was omitted, as symptoms of poisoning became manifest. At this time it was noted that the pupils were still only rather contracted. Pulse, 84; resp., 14; temp., 99°. Till this time the whole body had been persistently rigid, and he could not in the slightest degree move his head; but now, with the exception of his jaws being tightly clenched, his body is completely relaxed. There is slight general paralysis, he can raise his limbs slowly, but soon they slowly fall again. Moreover, he vomited a large quantity of fluid, and was able without assistance to raise and keep himself in the sitting posture. This movement did not bring on an attack. A slight seizure came on at 1.15, and another at 1.45; but, these excepted, he has been free since last report (two hours ago). Now, at 2.45, he took $\frac{1}{3}$ gr. of extract, and repeated it every quarter of an hour. A slight paroxysm took place at At 4 P.M. the muscles had returned to their state of tonic contraction, and felt very hard, but he had undergone no fresh paroxysm; 2 gr. of extract was ordered every quarter

of an hour. At 4.40 he had a severe paroxysm, lasting ten minutes, which arched him forwards; he then began a grain of extract every quarter of an hour. At 5.15 he experienced a slight attack, affecting only the muscles of the neck, with occasional spasms in both thighs. At this time there was very slight permanent rigidity of the trunk or extremities, but the jaws remained firmly clenched. The pupils were not extremely contracted, and his sight throughout has remained He can now move his head a little from side to side. At 5.35 a slight paroxysm set in, lasting about a minute, and at 6.10 a very severe one lasting nineteen minutes. During the last twenty hours he has taken 40 grains of extract, of which 30 were taken within the last ten hours. At 8 p.m. he had a slight paroxysm limited to the muscles of the neck, but with this exception he has been free for an hour and fifty minutes. At this time he was quite quiet. For the first time since his relapse he could just separate his teeth. He could move his extremities, which seemed to him heavy. Pulse 80; temp. 100°. He vomited at 9.5, and had rather a strong convulsion at 9.53, lasting ten minutes. Since the vomiting he has fallen back, probably from rejecting some of the medicine which had not passed into his system. At 11 there was some persistent rigidity of his extremities, his jaws being again tightly clenched. His limbs felt heavy, but he could easily raise them. pupils were strongly contracted. During the day he many times complained of severe colic and griping. At a little after 11 he took 40 grains of chloral and 20 drops of laudanum. He was ordered to take throughout the night 3 grains of extract every hour. At 12, midnight, he had a slight paroxysm, and then became restless and delirious, and got out of bed and walked about the room. During the day he stated that when he closed his eyes he saw faces and people walking about the room, these delusions disappearing directly he opened his eyes. At 1.15 A.M. he fell asleep. At 2 A.M. he had taken another 20 grains in the preceding eight hours. At 2.15 he had a severe paroxysm, lasting thirty minutes. At 3 he fell asleep, and slept soundly till 7.30.

Sept. 16.—At 8 A.M. Mr. Alfred Gould, who kindly joined me in attending Dr. O'Leary after his relapse, found our patient

sitting up in bed washing himself. His limbs were quite flaccid. but when moved they felt heavy; slight trismus continued, but he could separate his jaws above half an inch. Pupils much contracted. Pulse 87, stronger; temp. 97.6°. Ordered one grain of extract of Calabar bean every quarter of an hour. At 9.30 he finished another 20 grains of the extract, having taken this quantity during the preceding seven hours and a half. He got out of bed, stood unassisted, and then sat in a chair whilst his bed was made. I visited him at this time, and learned that he had had no attacks since the previous night. He lay quietly on his back, with his hands crossed. His muscles were all relaxed except those of the jaw. Colic and griping had entirely left him. He perspired a good deal in the night. He slept till 1, only roused at intervals to take his medicine. At 1, trismus had left All his muscles were relaxed, his limbs felt heavy, but there was no paralysis. Pulse 85; resp. 21; temp. 97°. Pupils strongly contracted. He complained of slight headache, and said that when he shut his eyes he saw pleasant visions, as persons presenting him with beautiful bouquets. He complained of a sensation of "haziness." When left alone he glided into an unobservant state, and would repeat over and over again part of a sentence, but on speaking to him he at once roused and finished it. He suffered from no nausea nor colic. Ordered to take 3 of a grain of the extract every quarter of an hour. At 3.15 he became completely and even dangerously paralysed from the Calabar bean. The nurse, on offering him his medicine, noticed that his eyes trembled and his head twitched, and he appeared to struggle for breath and became very red in the face. This state continued for three-quarters of an hour, when the nurse, noticing that the false teeth had slipped, at once removed them, and the breathing became free. Dr. O'Leary's account of his condition at this time is that his jaw dropped, and he found that he had completely lost power over his muscles, that soon his diaphragm appeared to cease acting, and his breathing nearly stopped. He says his mind was quite clear throughout, but I think this could not be quite the case, as an hour and a half afterwards, at 4.45, when we saw him and when the paralysis had nearly passed away, we found his mind in rather a "hazy" state, and, as formerly, he repeated half a sentence

over and over again before he finished it. Still the functions of the mind could not have been much affected, as he gave a clear and graphic account of his state. Dr. O'Leary states that when most under the influence of the medicine, his sensations were very similar to those he felt when he took a large dose of hashish, some twenty-five years before, at a soirée at Alex. Dumas's, in company with Eugène Sue and other notabilities: he felt perfect repose of mind and body, with agreeable visions, which frequently changed, some assuming the form of angels and lovely women. This character of the visions Dr. O'Leary attributed to his having read shortly before one of Swedenborg's At 4.45 ordered to take \(\frac{1}{2}\) gr. of extract three times in the hour. I need hardly say that the medicine was discontinued during the state of paralysis. At 6 P.M. he finished another 20 grains of the drug, having taken this quantity during the preceding eight hours and a half. At 7 P.M. we found him sitting up in bed, free from paralysis and spasm. He had had no attacks since those last reported, and had eaten some stewed He said he felt quite comfortable, and had lost his "hazy feeling," and he did not repeat his words. His pupils were not quite so contracted; he perspired but little through the day. At 10 P.M. he expressed himself as feeling quite well, except that his muscles felt bruised. Ordered to take 11 grs. of extract every hour through the night. He took the medicine regularly till 4.15. At 4 A.M. he finished another 20 grains of the extract, when he fell asleep till 8.

Sept. 17 (9 A.M.)—He had been free from tetanic and paralytic symptoms. We found him sitting up in bed reading Greek. His limbs felt a little heavy. His pupils were less contracted. Pulse 87; temp. 98.4.° He said he felt quite well. To continue $\frac{2}{3}$ gr. of extract hourly. He remained quite well all day, and ate an ordinary dinner. In the evening his pulse was 87; temp. 100.8°.

Sept. 18 (9 A.M.)—During the night, not feeling sleepy, Dr. O'Leary sat reading and writing till 6 A.M. Still feels a little under the influence of the medicine. Temp. 99°. To take ½ gr. hourly. At 12 noon he finished another 20 grains of the medicine. He got up for four or five hours and read. In the evening he said all feeling of heaviness and dimness of sight

had left him. His pupils were normal in size. Pulse 84; temp. 100.2°.

Sept. 19.—He continued his medicine through the night. He appeared quite well. We ordered him 1 gr. of his medicine every four hours. He dressed and went downstairs. On 20th he was so well that he came to the hospital, and was present whilst we made some experiments with the new Brazilian remedy, Jaborandi. He continued to take an occasional dose of his medicine.

This case is singular from the irregular course and from the rapidity of the disappearance of the symptoms. singular, too, from the fact that the spasms first attacked the lower extremities and gradually ascended the body. In the relapse, however, occurring on the discontinuance of the medicine, all irregularity disappeared, and the symptoms were those common to a very severe attack; the trismus, as usual, being the last evidence of the tetanus to disappear. The spasms were very little induced by external agents, even swallowing not readily bringing on an attack. Moreover, the attack yielded with unusual rapidity, for in thirty-nine hours after the relapse every vestige of the disease had disappeared. In treating this case we varied the dose of the medicine according to its effect; we attempted to keep up just sufficient paralysis to suppress the spasms. In spite, however, of very careful watching, serious general paralysis set in very suddenly, and that at a time when the patient was not taking the largest doses. However, these serious symptoms passed off in a short time. In respect to the dose of the bean, this case is less valuable than it ought to have been, on account of a dispensing error. The first bottle contained 10 grains of the alcoholic extract. Unfortunately the watery extract was subsequently dispensed by mistake. Still the results fully show that even this is a highly active prepa-In eighty-six hours Dr. O'Leary took 140 grains of the extract of Calabar bean; and of this, 88 grains were taken in thirty-two hours, that is, 23 grains per hour. For a short time he took 4 grains an hour. Even this large dose, however, has been exceeded, for Dr. Eben Watson reports a case in which 1.026 grains of the alcoholic extract were given in forty-three days. He gave small doses on the first day, but rapidly in_ creased the quantity, so that in a few days his patient took daily 16 grains, then 48 grains, then 57, and on one day 72 grains, without any serious amount of paralysis. We gave the medicine in moderate doses, repeating them frequently, so that on the advent of any serious degree of paralysis the further action of the medicine could be arrested; yet, spite of this precaution, probably from some inequality in the rapidity of absorption, serious symptoms did arise.

Various questions suggest themselves in connection with this singular case. Sir James Paget suggested that possibly the "nitrophenilic acid" Dr. O'Leary applied to his sore might have caused the symptoms, but I think this cannot have been the case, for the same applications had been applied on a former occasion for several days, without any tetanic symptoms; and further, Mr. Gould injected several drops under the skin of a cat without producing any symptoms whatever.

Did the Calabar bean cure the patient? I believe so; for on discontinuing it the symptoms recurred, but were again speedily suppressed by a return to the medicine. The recovery was certainly not due to the chloral and opium draught he took at bedtime, for the relapse occurred in spite of this draught.

Next in regard to the dose of the medicine administered. It may be said the extract was bad, but it was obtained of Mr. Morson, and was made in his laboratory. The large dose produced at first colic and sickness, but these symptoms speedily At first there was copious perspiration, but this I think was more due to the paroxysms than the medicine, for as soon as the spasms were subdued the perspiration almost There was no salivation. Moreover, the pupils were only slowly contracted, and did not become very small till the drug had been given for some time in very large doses, and after evident signs of partial paralysis had set in. Dr. Eben Watson noticed the same fact in his case. also was very little affected. The brain was slightly affected, as is evident from the details of the case. During this severe and painful and dangerous illness, it was impossible not to admire the extraordinary coolness and courage and patience manifested by Dr. O'Leary. After the cessation of a severe convulsion which shook every fibre of his body, he would look at

and smile, and say cheerfully, "Well, that attack is over." r. Gould and I felt it needful to visit him very frequently, id our patient, well aware of his danger, would say to us, "Oh, give you too much trouble—you needn't come so often; I'm cool hand, and I can watch the action of the medicine."

QUININE AND SUPPURATION.

BY DOUGLAS MORTON, A.M., M.D., Physician to the Louisville Hospital, U.S.

Some months since—before I had given any special attention to the property lately discovered in quinine, of exercising control over the suppurative process—a friend gave me a formula containing this agent, which he told me he had used with great success in treating genorrhea.

The quinine was prescribed in the strength of two-and-a-half grains to the ounce of distilled water, to be injected three or four times a day. This treatment in my hands has been followed by such uniformly good results that I have rejected all others in its favour; and the number of cases in which I have used it has been sufficient to afford a fair test of its value.

Though the formula contained other ingredients—zinc sulphate, tincture of gelseminum, and enough sulphuric acid to dissolve the quinine—I now think its efficiency is chiefly due to the quinine, and this through the peculiar influence which the drug is now known to exert over suppuration, in checking the amceboid motion of the white blood-cells and constringing the coats of the capillaries. I lately commenced a series of experiments, putting this theory to the test.

At this time I had under treatment a patient with empyems of nearly four months' standing, whose chest I had tapped a few days before, pumping away about three pints of very feetid pus. The treatment up to this time had been a daily washing out of the cavity with a weak solution of carbolic acid; and as

ret the pus continued to be discharged in considerable quantity, and to be very offensive.

This case I thought would afford an excellent opportunity for esting the property of quinine referred to above, as well as nother—that of staying the decomposition of animal matter, by very effectually destroying the vitality of certain organisms upon which this decomposition seems to depend. Accordingly, very day, after cleansing the cavity with the carbolic acid otion, about six grains of quinine in two or three ounces of vater were thrown in, and allowed to remain. Since the comnencement of this treatment the discharge of pus has rapidly liminished, and no unpleasant odour has been noticeable. The ratient in the meantime has made good progress towards ecovery, and her improvement in every particular seemed to begin sharply at the time she was put on the quinine reatment.

This patient is a young mulatto woman, and when admitted of the hospital was so extremely emaciated, so low in every way, hat in operating I feared I should uselessly inflict pain, and must onfess that I was finally moved to operate rather by the desire f Dr. Chandler, the resident physician, to see his diagnosis of mpyema positively verified, than by any hope I had of giving termanent relief.

With the view of getting better drainage, I made another pening after a few days, near the most dependent part of the leural cavity, and inserted a tube. This tube, however, slipped ut, and the opening closed, leaving the first, in which a tube bout a fifth of an inch in calibre had been inserted, to do the whole work.

I mention this because the patient has good prospect of ecovery under a condition which has been supposed unfavourable—that of having only one small opening into the cavity; either wo openings, or one made very large, by removal of a section of ib, having been deemed almost necessary to a good result.

My second experiment was made upon a large ulcer of two rears' standing, situated on the leg of a woman about forty years of age, who had for some time been suffering with mitral lesion, which had already begun to cause edema of the feet and ankles. The woman, moreover, was ill nourished, and had a very

unhealthy look. I give these particulars to show the unpromising character of the case.

The quinine was applied incorporated in benzoated zinc oxide ointment; ten grains to the ounce. The ulcer at the time this treatment was commenced secreted pus very copiously. After two or three days the suppuration had greatly diminished, and the whole surface of the sore was covered with healthy granulations. The healing process, considering the very unfavourable conditions, advanced rapidly up to the last time I saw the patient, a few days ago.

My third experiment was made in a case of mammary abscess which occurred in a primipara a few days after her delivery. The breast was opened in due time, and some six ounces of pus evacuated. Small purulent deposits, however, unconnected with each other, continued to form in spite of both general and local treatment. This condition of things seemed disposed to become chronic, and I determined to try the topical quinine treatment. The quinine, in the strength of ten grains to the ounce of water, was daily injected into the sinuses left after evacuating the small abscesses mentioned.

After being under this treatment three or four days, the deposits of pus ceased to form, and the patient rapidly got well.

As regards the gonorrhea cases treated with quinine, I am strongly inclined to attribute the good results to the use of this agent. The average length of time required to completely arrest the discharge has been shorter under this treatment than any I have ever tried; and in no instance has a patient come back to me, after leaving off the treatment a day or two, with a return of the discharge, as so often is the ease after treatment by astringents used alone. In no case has there occurred the complication of swelled testicle, a condition supposed by some, and no doubt correctly, to be due to the use of strong astringent injections; nor has any case terminated in gleet.

It may be well to add, further, that I adopted this treatment in the first instance simply upon the recommendation of a very intelligent practitioner, and that I did not have a theory of its action until long after I had recognised its efficiency.

I can easily believe that one opposed to this theory of the

action of quinine might not concur with me in the estimate I place upon the data derived from the other experiments, but I do not think that anyone free from bias could see what passed under my observation without being very favourably impressed with the merits of the treatment tested, and disposed to make further trial of it, with almost expectation of success—which, by the bye, is just the mental attitude I hold, after my limited experimentation.

I call attention particularly to the immediate effect following the quinine treatment upon the ulcer, of diminishing the secretion of pus, and inaugurating at once an active healing process, in which was afforded a clear illustration of the power of this agent to check the waste of force and material involved in profuse suppuration, and to direct them to the work of building healthy tissue.

Of my experiment upon the mammary abscess, I wish to say that, standing alone, I regard the data gathered from it as of very little value, and only give it place here as supplementary to the others.

THE USE OF MERCURY IN SOME OF THE OBSCURER FORMS OF SYPHILIS.

BY J. MILNER FOTHERGILL, M.D., M.R.C.P.

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Mercury is a most valuable remedy or a rank poison, according to the circumstances under which it is administered. Perhaps on the whole it has been as much the latter as the former. That such should be the case is a reproach to our profession. Without doubt the use of calomel in the treatment of the affections of infancy took its origin in the success attending its administration in certain cases. But in consequence of a want of careful attention to the peculiarities of these cases, and a nice discrimination of the characteristics of them, calomel came into wholesale use and did infinite harm. It may perhaps be too much to say that those cases where mercury acts so magically are all cases of congenital syphilis, but there is a grim truth underlying such statement, even if it be not exactly the actual truth, "the whole truth, and nothing but the truth."

Brought up in a county (Westmoreland) which, whatever its moral shortcomings, is singularly free from syphilis, and then taught scepticism by J. Hughes Bennet, my early leanings were towards the anti-mercurial treatment of syphilis. When brought face to face with syphilis in the Public Dispensary of Leeds, the first impression made on the mind was the extraordinary toleration of mercury manifested by the syphilitic. For instance, one patient had, according to his second paper—what was in the first is unknown—taken 1,200 grains of blue-pill, guarded by 400 grains of opium, and more than 11,000 grains

of iodide of potassium. The man was following his work, and fairly well. It was impossible to avoid the conclusion that if not protected by syphilis, this man could never have taken all this with impunity. The next step was to the conviction that mercury is of the greatest value in the treatment of syphilitic affections.

It was not merely during the first flashings out of syphilitic rashes in infants, nor the eruptions of secondaries in adults. that mercury seemed to exert its peculiar power. It was in those obscurer conditions of the tertiary stage, and in the early years of impaired evolution in the subjects of inherited syphilis. that this agent seemed to be peculiarly useful. It has been held that the remoter outcomes of syphilis yield most readily to iodide of potassium. This may be so; I am not attempting here to summarise the collective experience of the profession as to the use of mercury in the treatment of syphilis, but merely to put forward my own individual experience. It soon became apparent that in many conditions, and especially states of persisting anæmia, that the addition of mercury to the chalybeate employed at once inaugurated a change, and the anæmia yielded to the remedial measures. Again and again was this found to be the case. In fact, it would appear that there are conditions of anæmia associated with syphilis, just as there are states of anæmia found in connection with malarial intoxication, with suppressed gout, or with lead-poisoning. In these conditions it would seem that the blood-poison affects the bloodcorpuscles themselves-either destroying the red corpuscles, or hindering their formation. Under such circumstances the building up of the blood by iron is frustrated by the action of the poison. The removal of the virus by its own specific—quinine, potash, iodide of potassium—often relieves the anæmia ere iron be given. So in syphilis: the administration of mercury resulted in the palliation of the anemia of syphilis, and facilitated the blood-formation under the hæmatinic.

In many cases of arrested growth the employment of mercury supplied the factor requisite for the forward progress of the case. In fact, the question borne in upon the mind was this: When does syphilis cease to exert its influence over the child in whom it is congenital? It may sometimes vanish altogether

in the wholesale eruptions of the first months of babyhood, but such is not the rule. Even if latent and no longer obtruding itself upon the observation, it crops out commonly in the conformation of the permanent teeth. The poison of syphilis, or the tendency to such changes as are well known in connection with syphilis, had lain quiescent somewhere, slumbering apparently. But it is hard to conceive that during all this time the taint is not exercising some influence, either permanent or It may be silently distorting the cranium, in outbreaks. destroying the ovaries, stunting the growth, arresting the development of the nasal bones, or modifying the conformation of the permanent teeth. From time to time there are indications These are commonly manifested in of its deeply buried action. perversions of nutrition. That these perversions have something specific about them is shown by the fact that though they are little influenced by ordinary hæmatics and nutritive food, they at once yield to the solicitations of their specific remedy. Where the peculiar teeth pointed out by Hutchinson are to be seen, a clue is at once given to the line of therapeutics to be followed. No matter what the perversion of nutrition, whether anæmia, skin eruptions, or ulceration, whether external or of the gums, the addition of ten or fifteen drops of the liquor hydrarg. bichlor. to five drops of the muriate of iron three times a day after food, will at once inaugurate a change and institute an improvement.

One of the most unfortunate matters in the therapeutic use of mercury has been the forgetfulness on the part of those using it of its generally destructive action on the blood and tissues. And, indeed, not that only, but even a spare diet has often been conjoined with it. No wonder, then, that the mischievous consequences of the administration of mercury became vividly apparent. But can we say that some fault does not lie at the door of the administrator who is oblivious of this action? There is no such thing as unalloyed good in this world, and still less in the domain of therapeutics—where the substitution of a lesser evil for a greater is often all that can be aspired to. Consequently, then, while mercury exercises its undoubted action on the syphilitic virus, it also wields its wonted destructive action over the rest of the organism. In order, then, to reduce

this latter effect to a minimum, it is necessary to combine with the mercury hæmatics and a liberal dietary. In fact, it is commonly as necessary to do this in order to obviate the ill effects of a course of mercury, as it is to combine the specific effects of mercury with those of iron in certain anæmic states. In all cases, indeed, the tendency of congenital syphilis to arrest and pervert nutrition should be borne in mind, and the combination of the specific with the general treatment is strictly indicated.

In exactly the same way must we approach the treatment of several remote manifestations of the syphilitic virus in the adult. For instance, a married woman presents herself with a history of failing health and recurring abortions, her first children being healthy. Her husband has been perfectly faithful to his marriage vows, and there is no history of new infection. But there is a doubtful history in the past of syphilitic infection, which has never been troublesome at all, and has been well-nigh for-In addition, she may point to an occasional spot on a limb, usually on both limbs together; or she may complain of cheumatic pains along the collar-bones, or in the arms and legs. Such a conjunction of symptoms at once warrant a suspicion of syphilis; and the fact that the course run is somewhat irregular and has not kept to the beaten track, is of no weight in the liagnosis of an affection so varied and so Protean. one fact that is of primary importance is the presence of syphilis. Why it should have permitted of several pregnancies without disturbing their course; why it should leave the husband and fasten itself upon the system of his unoffending wife, are not questions for us, so much as how without delay to dislodge the intruder, or if that be not feasible, to scotch its head and neutralise its pernicious influence,

It is easy to administer some iodide of potassium and watch the result. It is a matter of certitude that many of the marvellous cures by iodide of potassium are cases of unsuspected syphilis. Or the solution of the bichloride of mercury may be given in quassia, and the results watched carefully. If the well-known effects of mercury upon the mouth are induced it may be at once withdrawn, but if there be marked tolerance of it, with benefit to the symptoms, then the original suspicion becomes something more assured. It must not be supposed for a

moment that I suggest that this experimental treatment be tried without there exist suspicious circumstances, or until other measures have been tried and found inoperative. What I do wish to insist upon is, that where there are suspicious circumstances—not in the history merely, but in the tout ensemble of the case—the patient should at once have the benefit of specific treatment, and it should not be withheld from any sentimental considerations. Hebra says the physician should recognise syphilis by the eye without the aid of inquiries, as a clothier knows a piece of cloth; but it is not given to all to be able to do this. No doubt the suspicious factors strike some minds more forbibly than other minds, but again this is much a matter of training and education.

The importance of recognising the syphilitic factor in complaints so far removed from our ordinary experience as mental conditions, is well shown by Dr. Clifford Allbutt in an article in the "West Riding Asylum Medical Report" for 1873. In that most instructive paper are given several cases where the symptoms were mental, and which resisted unmoved the ordinary In one case tonics and sedatives utterly failed to give relief, and it was only on putting the patient on specific treatment that relief was obtained. "As he passed under the influence of mercury and iodide of potassium, his morbid fancies were dispelled, and his mental conceptions underwent a transformation which surprised even himself." Dr. A. R. Hall, of the Royal Artillery, related to me recently a case of a child in India wasted to the last degree, and in which there was a suspicion of syphilis, where he was consulted. To the horror of the medical attendants and the mother, he advised a grain of calomel daily in three doses, together with inunctions. This seemed just calculated to finish off the unfortunate infant. As, however, Dr. Hall held strong views about the combining of mercury with good food and plenty of it, in a month the condition of the child amply justified both the diagnosis and treatment.

In one of numerous cases under my care at the West London Hospital, the importance of this method of treatment is well illustrated. The girl is fourteen years of age, pale and stout, with sunken nasal bones, tertiary-looking ulcerations of the gums, and a nasty ulceration of the leg. She had been taking iodide of

potassium in full doses for some time with little or no effect. It occurred to me to put her upon a combination of mercury and iron, and the change is most marked and satisfactory. Several cases of obstinate anæmia in children are moving forward under a similar combination. In another case a man presented himself with cough and chest symptoms, and on uncovering his chest to examine him, a faint but suspicious rash became Without hesitation I at once ordered him iron discernible. and mercury, and his rash is gone, his general health is much improved, and his chest is improved also. Whatever the growth in his chest, producing dulness, it is disappearing The importance of combining mercury with satisfactorily. hæmatics and tonics in cases of syphilitic taint, and the equal importance of uniting these measures with a prolonged mercurial course, where the generally destructive action of mercury is to be obviated and neutralised, are becoming so apparent, and the results are so satisfactory, that they seem worthy of publication.

A word as to the combinations to be used. In many cases the union of the solution of the bichloride with iodide of potassium may seem desirable. But if there be anæmia or debility, it is better to combine it with the muriate of iron. In other cases a pill of the following kind seems indicated, and is an agreeable form:—

Hyd. bichlor. gr. v.
Fer. sulph. exsic. gr. xxjv.
Pulv. capsici gr. x.
Pil. al. et myrrh q.s.
In pil. lx. div. 1 bis in die.

Each pill to be taken after a meal, so that the iron and the mercury may be thoroughly incorporated with the food. This should be followed up, on Ricord's plan, for several months after all symptoms have disappeared. The syphilitic virus has not merely to be compelled to withdraw itself into obscurity, it should be followed up and exterminated, while the system generally and the general health should be well supported during the whole of the eradicating process.

The importance of maintaining blood-formation and feeding

the system at the time it is being subjected to a course of mercury more or less prolonged, is demonstrated by the following quotation from Headland:- "Mercury disintegrates or decomposes the blood, and thus wastes the body. This is the systemic action of mercury, on which too much stress cannot possibly be laid. Dr. Wright has analysed the blood of patients It is materially changed. It conunder mercurial action. tains more water and is more prone to putrefaction than The fibrine, albumen, and red globules are healthy blood. diminished in amount, and a feetid, fatty matter is present in large quantity." Such are the effects produced by the agent which is so valuable in its action upon the virus of syphilis. Consequently, while we take advantage of the power of mercury to annihilate the poison of syphilis, or, if that is not always attainable, to reduce it to such limits that its effects upon the organism are inappreciable, we ought to protect the system, as far as possible, against results which are unsought and undesirable—which are, in fact, the drawbacks to our remedy, the bitter dregs in the cup we wish to quaff. In order, then, to get at the honey and yet avoid the sting, it is of great importance to conjoin mercury with hæmatics. In conditions of impaired evolution and states of anemia, which are given above as some of the remoter outcomes of the syphilitic taint, such combination is especially indicated. In these cases there is already existing an imperfect nutrition, and a poverty-stricken condition of the blood to be remedied. However much these may depend upon the presence of a poison which is most effectually met and neutralised by mercury, they are not likely to be effectually remedied if the destructive effects of mercury upon the blood are not also met and compensated by liberal quantities of food and hæmatics, and, if necessary, cod-liver oil. should strive after is to get the good effects of a mercurial course upon the syphilitic virus and its consequential results, while at the same time we protect the organism against the evil effects of the action of the mercury itself. The stronger the existing impression that in many cases the mercurial course is too transient, too briefly continued, for the perfect eradication of syphilitic poison, and that in most cases a much longer course is indicated, the stronger is the corresponding impression

that the mercurial course should itself be secured against more mischievous consequences of its administration than are absolutely unavoidable. The views of Ricord of following up the palliative treatment of syphilis long after it has apparently disappeared from our observation, are gaining ground. physiological experiments as to the antagonism of certain agents in the body are giving us clearer ideas as to the action of mercury upon the syphilitic virus. Mercury does not exert its influence merely by its alterative action—its effects upon the excretory emunctories generally; it appears to have some direct antagonistic or destructive action upon the poison of syphilis itself. If such is the case, the argument for following up the mercurial course until the last molecule of syphilis is destroyed is much strengthened. But this requires a long period of time, probably, and long mercurial courses are very objectionable at least, as ordinarily conducted. If, however, the evil consequences of the mercury can be removed or mitigated by giving it in certain combinations with liberal supplies of food, such continued courses of mercury lose much of their objectionableness.

ON THE USE OF THE CONSTANT CURRENT IN SPERMATORRHŒA.

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THE application of electricity in cases of confirmed spermatorrhoea, though recommended many years ago, seems not to have found that attention amongst the profession which it justly deserves. Nearly all our text-books, while giving a long list of remedial agents, do not mention electricity at all; and even treatises on electro-therapeutics, with few exceptions, dismiss the subject with but few words. The subjoined cases, however, will show that we possess in electricity, after all other remedies have failed, a most powerful and efficacious means in arresting and curing that obstinate disease, which renders the patient a curse to himself and an object of misery to others.

The first case that came under my notice was that of a young man, aged 23, whom I saw for the first time in October 1873. He had then been an out-patient of the infirmary for five years, having been repeatedly transferred from the medical to the surgical department and back again. He had been treated amongst other things with strychnia, cantharides, bromide of potassium, and blisters; he had had the *porte caustique* applied several times, and had even a part of his prepuce removed, yet his condition grew worse and worse, and he was rendered perfectly impotent.

As regards his previous history I took the following notes:— Albert B., 23 years old, remembers to have suffered from scarlet fever complicated with dropsy when seven years old; when fifteen years old he first noticed trembling in his legs, fatigue after slight exertions, and uneasy sensations in both inguinal regions. At seventeen he began to suffer from frequent nocturnal pollutions; a year later he came to the infirmary, but the disease progressed; the noctural emissions were joined by involuntary emissions by day; semen began to be discharged on micturition and defecation, or by lascivious thoughts, the erections became weaker, and ceased altogether two years ago. The trembling in the lower extremities, which he had first noticed, increased and was followed by loss of memory, despondency, and great psychical depression.

He further stated that he began to masturbate when fourteen years old, and continued that practice till he was seventeen, but has never recurred to it since.

The patient looked thin and emaciated, had a sallow complexion, and stinted stature. The physical examination revealed nothing abnormal: the testicles seemed well developed; pressure on the spermatic cord was however painful; the urethra discharged a colourless, glary fluid, which on microscopic examination showed a large quantity of epithelial scales, granule cells, and spermatozoa, which latter, however, consisted chiefly of the well-defined head, without the tail. The lumbar region of the spine was painful on strong percussion. The legs were trembling, but not the arms; but there was no paralysis, and the electromuscular irritability and contractility seemed normal.

The patient was treated medicinally from October 1873 to March 1874 without any benefit whatever. On the 14th March electricity was applied for the first time in the form of the constant current; 29 elements of Weiss's battery were used, the positive pole applied on the lumbar part over the spine, the negative pole in different points along the perineum, scrotum, and inguinal region. The patient presented himself again on March 19th, and reported great improvement. He stated that on leaving the infirmary after having been galvanised, the first effect he noticed was, that the sight of young females, which had always caused a peculiar dragging in the penis, had no such effect, and for four days he had no emissions, except on going to stool, but he had as yet had no erections. He was again galvanised that day (19th March), and returned on the 21st, stating that he had that morn-

ing had an emission, preceded by an erection. Galvanisation was then continued in the same way, and in the course of a month great improvement had taken place: the emissions without erections had ceased altogether, the erections themselves became stronger, and appeared chiefly in the morning on awakening; there was still, however, a discharge with defecation. The treatment was continued, the improvement kept pace with it, and about the end of June he considered himself completely cured; the only semen he now lost was at nocturnal pollutions, which did not happen oftener than once or twice in a fortnight. The improvement in the other accompanying symptoms was no less marked; his memory improved, and the despondency left him; the legs, however, yet trembled a little, especially on excitement.

I saw the patient a fortnight ago, when he assured me that he considered himself quite well, and had taken up again his occupation, that of a bookbinder, which he had left off for nearly three years.

Unfortunately, I have not been able to examine the semen since the application of the galvanic current was first tried.

The second case was that of Francis M., aged 22, who came to the out-patient room for the first time on February 19, 1874. suffering from "faints and debility." His history is briefly told. When a child he suffered from convulsions, which ceased with the expulsion of a tapeworm. He began to masturbate when thirteen years old, and remained addicted to onanism for The first symptoms of seminal weakness showed themselves at sixteen, in the form of frequent nocturnal pollutions and imperfect erections. His infirmity increased, and he suffers now, and has done for years, from involuntary emissions by day and night; he has, however, still incomplete The accompanying nervous troubles were excessive erections. weakness, vertigo, loss of memory, great depression of spirits, and for the last twelve months (and for which he chiefly sought advice) repeated "faints." He had not been able to follow his work, especially on that account, for the last twelve months. The genital organs presented nothing peculiar; the sperma I was unable to examine. The general appearance of the patient resembled very much that of Albert B. I tried tonics and cold water enemata, but without success, and the patient soon left off

treatment. Seeing the excellent effects of galvanisation on the first patient, I looked up F. M., and persuaded him to subject himself again to treatment. I modified the application of the constant current in this case by merely making use of descending labile currents of twenty-nine of Weiss's elements. The first sitting took place on the 25th of April, and was already followed by a marked improvement in the form of more powerful erections. The treatment was continued in the manner indicated twice a week, for a month, with the most gratifying results, the only abnormal symptom remaining being a nocturnal pollution happening about twice or three times a week. The general health of the patient was, however, as yet far from satisfactory, and he availed himself then of an opportunity which afforded itself to go on a long sea-voyage. I have heard nothing from him since.

The third case is that of a young man, W. O., 22 years of age, who had been under treatment for writer's cramp, for which the constant current had been steadily applied for six weeks (the treatment began in the middle of June), without any marked result. The patient, however, wished to have the treatment continued as it had cured him of a disease "which he was too ashamed to confess when applying for advice." He stated that for two years he had suffered from involuntary emissions by day; he had never lost the erectile powers, but the least erotic excitement had brought on an emission of semen; for this complaint he had been to a hydropathic establishment, and he had consulted some of the most eminent syphilitologists on the Continent without any permanent benefit. The cause he assigned to onanism. He described the effects of the constant current, which had been applied along the whole length of the spine, as very astonishing, and assured me that after a fortnight's treatment the daily emissions had stopped and the erections became of longer duration. The patient has remained under my observation ever since, and while the writer's cramp remains as intractable as ever, he has completely regained his sexual powers, in proof of which I may cite that about a month ago I treated him for a very smart attack of gonorrhea.

The above are the only cases of spermatorrhœa which have come under my observation, and the results, I think, very fairly variant he assertion made it he penting it his nonmanication, that we have it he constant current the must efficacious rement or even very inverserate uses at merinaturalization.

AS PORTES DE TENANCE I DE TENUMENT. I VISIL EL PREV ALtention o uses i and i viere he sumi suri vas ar y galvanued, with a mich energy is i the remini myous had been tirectiv miranised, a was ione by Althous, who miranised the merica: and lammus, and Lerros, who give three mass, where a tesecrating current was cassed from the some to the perimeum. That his nomin is so a not iscomming for whether the evil effects of long-continued mermatorrides, he find ut the repeated lesses it to notice abundances a mounter is the seminal fluid or To the strain in the nervous exercity by the substrain excitement of frequent massurpation, there can be no finite time the final effects moceci nom terangements in the nervous spherederangements for vinch the stimulating effects of the constant entrent un particulariy mulicable. Extracement recent researches it mitz Philiper: Arra. 1871. p. 1821 teml to show that there exists a separate herve-senter for the nervi effectes in the inmost portion if the spinsi rord.

In muchasion. I will may remark that in the cases related above it seemed immaterial whether the ascending or descending current was used.

Clinic of the Month.

Treatment of Chronic Strumous Synovitis,—Mr. Barwell calls attention to a special mode of treatment which he has found useful in that form of articular disease, especially of the knee-joint, which was described by Sir Benjamin Brodie under the title of a morbid change of structure of the synovial membrane, and which he regarded as incurable, and of the same order as schirrus, medullary sarcoma, and fungus hæmatodes. This disease is the true white swelling, and on anatomical examination the cavity of the joint is found to be encroached upon by a light brown or rosy tinged jelly, into which all tissues from the skin inward appear to be converted. The jelly is traversed by fine wavy blood-vessels, is intersected by a few thin white fibrous bands, and is marked here and there with blotches of a yellower hue. On microscopical examination this substance exhibits the characters of growing embryonic tissue, consisting of cells round and oval, of bare nuclei, and granules; intermingled with these are fusiform cells. It is identical in macroscopic and microscopic characters with the material that forms the granulations and the subjacent bed of an indolent ulcer; the same is also abundantly present in the swollen mass that surrounds carious tarsal or carpal bones; it is, in fact, a simple granulation tissue developed in strumous inflammation. It is both sluggish and invading. The obstinacy, the reputed incurability of these cases depends not on too high, too violent an action, but on want of action—on insufficient power to continue the processes which have been begun. Therefore joints in this condition are white and bloodless-looking, and their temperature may actually be lower than that of the sound side. Hence Mr. Barwell thinks that to keep such a joint at perfect rest, poulticed or with lotions, is a mode of treatment adapted to prolong such injurious inactivity, and he has for some long time past adopted frictions, pressure, passive and then active movement, with considerable success. He has recently employed a more rapid and decisive method of dealing with such disease. It appeared to him that it would be possible by a direct application to stimulate the sluggish tissue of a strumous synovitis into more healthy condition, and for this purpose injection of minute quantities of a stimulating drug seemed to him the most direct method. He therefore began experiments, injecting first one fluid and then another, but always with caution. The first used was iodine, and no other was found to give equally satisfactory results. In all his later cases he has employed half a drachm of tincture of iodine, filling up to the ounce with water. The method of using the solution is to inject it into the tissue with a very fine needle. Care should be taken that no inflammatory process is going on; the temperature of the joint must be at or below par; there must be no pain, or only a dull aching. Starting of the limb is usually a contra-indication. When the conditions are favourable he injects into two or four points about five minims of the solution, after which pressure is applied by an elastic bandage. (British Medical Journal, Oct. 17, 1874.)

Treatment of Asiatic Cholera.—In a paper on this subject read before the Med. Chir. Soc. of Edinburgh, on the 3rd of June, 1874, Dr. Robert Pringle, whose experience in the disease has been considerable, maintains that the efforts of nature to throw off the poison should not be checked; on the contrary, they should be judiciously aided by draughts of tepid water to dilute and emit the poison; and if necessary, even small doses of castor-oil (the indigenous mild laxative of the country where cholera may be said to be endemic), tepid water injections, and the employment of every known remedy except the administration of spirituous stimulants to restore the tone of the circulation and to bring back the natural heat; but, above all, judicious and persevering nursing. On the reaction (following the collapse) setting in, food in small quantities, such as soups, &c., must be frequently given, but all spirituous stimulants are to be avoided, as they interfere with the natural powers in their attempts to rally from the severe prostration resulting from the absorption of the cholera poison and efforts of nature to emit it. The stimulant which appears to be particularly suitable at this period of the disease is ammonium carbonate, in combination perhaps with sulphuric and nitric ethers in camphor mixture. Dr. Pringle considers that all medicines which tend to check vomiting and purging, such as narcotics, and particularly opium, or those remedies which act like ice, must act injuriously. (Edin. Med. Journ., Sept. 1874.)

Fibrous Tumours of the Uterus treated by the Hypodermic Injection of Ergotine.—Dr. Lombe Atthill, of the Adelaide Hospital, in a paper on this subject, remarks that it is well known to gynæcologists that ergotine, that is, a fluid con-

taining the active principles of ergot of rye, when injected hypodermically, has a powerful influence in arresting hæmorrhage depending on the existence of uterine fibroids. The results of several cases so treated by Prof. Hildebrandt, of Königsburg, appear to have been eminently satisfactory. Menstruation in all of them became regular in its recurrence, to a marked extent less profuse, and less painful. Influenced by his success, Dr. Atthill, in common with many other practitioners, has tried the treatment thus recommended, and gives the details of three From the results of these he thinks the following conclusions may be drawn:—1. That Wigger's pure ergotine is inert, and useless for the purpose of hypodermic injection. That Bonjean's ergotine hypodermically injected exerts a marked effect on cases of uterine fibroids, lessening the amount of blood lost, and lengthening the periods, but that its use is liable to be followed by the formation of abscesses. 3. That the extractum ergotæ liquidum, B.P., is still more efficient in checking the uterine hæmorrhage occurring in these cases, but that its use causes at the time severe pain, and that troublesome abscesses are very likely to form at the site of the injection. To Dr. Atthill it seems remarkable that in Dr. Hildebrandt's cases no unpleasant symptom ever resulted, while in his, abscesses invariably, sooner or later, occurred. He can only account for this discrepancy in results by supposing that the ergotine used by Dr. Hildebrandt is different from any he could procure, and he looks forward with much anxiety to his promised further contribution on this subject to the American Journal of Obstetrics. (Irish Hospital Gazette, Sept. 1, 1874.)

Extracts from British und Foreign Journals.

Treatment of Intestinal Obstruction.—Dr. Libur was called to a man suffering from prolonged constipation, vomiting, and violent pain in the belly. He diagnosed intestinal obstruction, caused by invagination in the ilio-cæcal fossa. Opium and drastic cathartics were administered without effect. Dr. Libur then injected into the rectum a concentrated solution of bicarbonate of soda, and immediately afterwards a concentrated solution of tartaric acid. A large quantity of carbonic acid gas was eliminated, which forcibly distended the intestinal tube. The gases and the fæcal matters forthwith escaped freely, and the relief was complete. (Revue Méd-Chir. Allemand. 1874.)

Remarks upon the course of Labour, and the Treatment in Contracted Pelvis.—A paper on this subject was read by Prof. Spiegelberg in the Gynæcological Section of the Natural Science Meeting at Wiesbaden. The three forms of contracted pelvis which we meet in practice are: 1. The simple flat pelvis (of ricketty origin or not). 2. The uniformly and generally contracted pelvis. 3. The irregularly contracted pelvis. The latter of these is more frequent than the second. In the first form it is the anterior part of the vulva which presents at the entrance of the pelvis. The chin is easily removed from the chest, the large fontanelle comes lower than the small, the coronal suture approaches the conjugate, the bi-parietal diameter is on the opposite side: in a word, it is the anterior part of the vertex which presents. The mechanism of the passage of the head consists of two movements, one about the frontooccipital axis, the other about the transverse axis. The sagittal suture comes forward; the occiput goes more deeply backwards. Labour may take place spontaneously. If the condition of the mother necessitates an operation, it is only exceptionally that the forceps will be of use; as a rule, the head must be lessened. If the difficulty is recognised sufficiently early, version should be performed. The course of labour in the second form is quite different from the above. Here the head when it enters the inlet meets with an obstacle in all its circumference. The head is strongly flexed, and enters the cavity of the pelvis, faithfully represented by a wedge. The face is directed to the fundus of the uterus, and the occiput is the presenting part. In such cases we must dread impaction of the head. If such occurs, we must have recourse to craniotomy as early as possible. should never be used. In the third form we have the anterior part of the head or the occiput presenting at the inlet, according as the flattening or the general contraction predominates. At times also the head is engaged in a position inclined to one side, and consequently a presentation of the ear. If this condition is recognised early, version should be performed; but if the width of the pelvis is not sufficient for success, perforation should be performed as soon as it is evident that the head cannot be adapted to the pelvis. In the contraction of the pelvis it will often be necessary to perforate; version must be reserved for certain cases, and the use of the forceps rejected. If craniotomy is necessary, it should be performed as early as possible to avoid the injurious effects of pressure. Spiegelberg employs the trepan for perforating; for extracting, the cephalotryptor, or the cranioclast. (Archiv f. Gynæk. Band vi. heft 2.)

Transfusion of Blood.—Dr. Thomas Morton, of Philadelphia, writes that the transfusion of blood may be so readily performed, and with such entire safety, that it is surprising it is not resorted to more frequently. Transfusion seems especially indicated when death is imminent from hæmorrhage; while in slow convalescence from fevers, in anæmia, and in diseases accompanied by excessive drain, or in cases of blood-poisoning. this operation, by introducing a vigorous healthy element directly into the circulation, would seem particularly applicable. In transfusion the surgeon has the choice between the immediate and the mediate methods; in the former, arterial or venous blood is conducted direct from an artery or a vein in the donor into a vein of the receiver. In the mediate method, the blood of the donor is defibrinated, strained, and then injected. mediate method does not appear to have ever been performed in Philadelphia, while the transfusion of defibrinated blood has been very successfully done a number of times. In the immediate method, small clots of blood, it is supposed, are liable to form in the connecting rubber tubing between the donor and the receiver, and then, if injected, would doubtless produce serious results; venous blood is also generally transfused, since arteriotomy is seldom if ever recommended. Immediate transfusion from the radial artery, as has been suggested, would answer admirably for the receiver; but donors of blood, although they might be willing to submit to venesection, would hardly NO. LXXVII.

allow the opening of a main artery. Dr. Morton, having used defibrinated blood now in four cases with perfectly satisfactory results, sees no reason for relinquishing this plan in favour of the immediate method; for (1) There is no danger from the formation of clots, or from the introduction of air. (2) The donor's blood, which is venous when drawn, is partially oxygenated by its exposure during defibrination. (3) The amount injected is readily measured. (4) No haste is required in the performance of the operation. (5) Drawing the blood and its defibrination need not be conducted before the patient. Dr. Morton gives a drawing of his apparatus, which appears to be compact and well adapted for the object in view. (American Journal of Med. Science, July 1874.)

Treatment of Typhoid Fever.—The development of typhoid fever in many parts of France has attracted particular attention to its treatment. The enthusiasm expressed by the physicians of Lyons in regard to the advantages to be obtained by treatment with cold baths has not met with much approval in other quarters. In the clinique of M. Siredey, a general method of treatment has been adopted, which seems to have given good results. He gives in the first instance, especially in those cases in which the gastro-intestinal symptoms (coated tongue, nausea, and diarrhea) are present, twenty grains of ipecacuanha, with half a grain of weak tartar emetic, wine and water for drink, and beef-tea. The next day, julep of gum four ounces, with thirty grains of liquid extract of cinchona, taken in divided doses, and an injection containing vinegar or carbolic acid. Several times a day the mouth of the patient is very carefully cleaned with a slice of lemon; morning and evening the body is sponged with a lotion containing vinegar, and is immediately rolled up in wool. This proceeding is peculiarly grateful to the patient. A glass of Sedlitz water is often given in the course of the disease, and as convalescence sets in quinine is ordered in all its forms. Of twelve cases thus treated all recovered. A point open to question is whether cold affusions do not tend to produce intestinal hæmorrhage. M. Miramont de Mery (Savoy) suggests, as a means of reducing temperature, air instead of water baths. The patient is placed on a hair mattrass, covered only by a sheet, and in the middle of a large room. The bed should be changed several times a day, and in the event of delirium or exacerbation of the febrile symptoms, the patient is to be made to walk about in his shirt till he is cold, when consciousness will return. (Journal de Médecine, Sept. 1874.)

Digitalis in Puerperal Cases.—Dr. Winkel, who has made various experiments with the different preparations of digitalis, does not hold it to be a specific in puerperal fever, but ad-

ministers it as a prophylactic against the phlegmonous process. Where disturbance of the digestion results, he discontinues its Dr. Winkel found the hypodermic use of digitalin, dissolved in equal parts of alcohol and water, in the proportion of 001 gramme of digitalin in three grammes of fluid, to be the best method of administration. The mean requisite dose is 005 gramme. The advantage of this preparation is found in the smallness of the dose and the ease with which its action may be regulated. The effect follows in two or three days generally, a simultaneous sinking of temperature and pulse being observ-Elimination cannot be absolutely stated to take place through any organ. Digitalin appears to act upon the brain, producing rest, better sleep, and enlargement of the pupil. It appears also to act as a styptic, recommending itself in this respect after severe hæmorrhage. The question as to the tolerance by puerperal women of large doses cannot as yet be answered, the assertion of its only partial absorption through the altered condition of the intestine being unsupported by proof. The favourable action of digitalis is attributed by Dr. Winkel to its effect upon the circulation, for as in the chills of the puerperal condition the prognosis is more favourable when the pulse is not over 100, it is evident that a remedy which will prevent such increase must be beneficial. The observation of after-pains following the continued use of digitalis, together with its styptic action, has given rise to the conjecture that its effect is upon the unstriped fibres of the uterus. contraction of the capillaries it prevents exudation of the colourless blood-corpuscles. (New Remedies, vol. iii. No. 13, 1874.)

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Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Baillière, of King William Street, Charing Cross.

Department of Public Bealth.

THE REGISTRAR-GENERAL'S WEEKLY RETURN.

WHATEVER tends to bring the Registrar-General's "Weekly Return of Births and Deaths in London and in twenty other Large Towns of the United Kingdom" into discredit is to be deprecated. We have a growing fear, however, that the late introduction of death-rates of Indian and foreign cities into the return must have this tendency, and for the following reasons:—

First, the space given to these death-rates in the return is out of proportion to their importance, whether for statistical or practical purposes—if, indeed, they can truly be said to have any practical importance at all. In the return now before us, No. 40 of the present year, of eighty-seven lines of letter-press given to the mortality of the week, no less than twenty-six are devoted to Indian and foreign cities.

Next, the Weekly Return is presumed to have for object an essentially practical end. What practical end, we would ask, is gained by publishing on the 10th of October the death-rate of the following cities at the dates stated?

	Week ending	Week ending
Calcutta	. Aug. 22	Christiania Oct. 15
Bombay	. Sept. 15	Berlin Sept. 26
Madras	. Aug. 21	Breslau Sept. 26
Paris	. Oct. 9	Munich Oct. 3
Brussels	. Oct. 3	Vienna Oct. 3
Amsterdam .	. Oct. 3	New York Sept. 19
The Hague .	. Oct. 3	Brooklyn Sept. 19
Copenhagen.	. Oct. 1	Philadelphia Sept. 19
	•	

If it be desirable to give this kind of information in the Weekly Return, surely it would be well, as with meteorological returns, to make arrangements for the deaths of the several cities to be telegraphed for near and corresponding periods. As matters stand with these death-rates, why should they not be relegated to the Quarterly Return?

Again, the space given to these death-rates of Indian and foreign cities might, we think, be devoted to an immeasurably more important purpose. As the Weekly Return now stands it is to some extent misleading, except to the initiated. The London of the Return is the London of the metropolitan area. But London now, topographically considered, has extended much beyond this There is an inner London with a population of 3,400,000; there is an outer London (the Greatest London of Dr. Farr) with a population of 650,000. This outer London—much of it a direct overlapping and outward spreading by inner London of its border, much a linking of suburban villages and towns to the inner by the filling up of the intermediate spaces with housesis excluded from the Weekly Return. While the movement of mortality among the three millions within the border is duly chronicled from week to week, the mortality among the 600,000 outside the border is chronicled once in three months only, and then not as a whole, but in different portions, according to the topographical position of the different registration districts in which the various segments of outer London fall. practical good is derivable from the Weekly Return for inner London, would be equally derivable for outer London, if that portion of the environs were included in the returns. At the present moment, when scarlet fever as shown by the mortality returns is spreading widely in East London, there is no knowledge of the state of the disease in contiguous West Ham. In fact, there is no clue to watch the probable interchanges of infectious diseases between outer and inner London, and the first necessity for such a clue is the frequent knowledge of the movement of mortality, and especially of the mortality from certain diseases, in outer London

At present the London of the Weekly Bills is in fact hemmed in by a broad band of population, living mostly under imperfect sanitary conditions as compared with the population in the metropolis, and forming a constant source of sanitary danger to the metropolis. Only since the passing of the Public Health Act 1872 has the greater portion of this band of population come under systematic sanitary supervision, but London has no means of judging, at intervals sufficiently short to be of practical value, of the state of disease within this suburban population. This is perhaps only to be obtained at present, and it would certainly be best obtained, by bringing this outer London within the bills of mortality. It appears to us that the same discretion that has admitted Indian and foreign cities as well as our own large towns into the Weekly Return, would be equally competent to include outer London. For purposes of utility, as well as from the magnitude of the question, this inclusion is of far greater moment than the other inclusions; and it is much to be desired that the Registrar-General will extend his Weekly Bill so as to take in outer as well as inner London.

HYGIENIC SOPHISMS.—DR. LETHEBY ON DEATH-RATES.

Dr. Lethery's address on opening the present session of the Society of Medical Officers of Health would form an admirable examination paper for graduates in State Medicine. almost seem, indeed, to have been designed for this purpose, for a better test of the public-health capacity of a man than that of separating the facts from the fallacies contained in it cannot well be conceived. Dr. Letheby is a master of paradox, and in this address he has displayed this power in a way which must command admiration, and which is in the highest degree instructive. The subject of the address was the way of estimating the sanitary condition of communities and the comparative salubrity of towns; or, more accurately, this subject was only partially dealt with in it, the address being almost wholly occupied with an examination of the value of death-rates as indicating the state of health of communities. Dr. Letheby started with the proposition that "the common and vulgar method" of estimating the salubrity of places "by the death-rate as usually calculated, was entirely fallacious;" and then proceeded to illustrate this proposition by showing the disturbing effects of migration, the birth-rate, the proportion of the two sexes, and other circumstances. These several sources of fallacy he discussed at considerable length, showing their influence upon the death-rate by numerous statistical statements bristling with figures; and from the whole he concluded that the death-rate, as usually calculated, was "no longer expressive of facts." Or again, as he phrased it in other words: "The death-rate as usually calculated and ostentatiously paraded as an indication of salubrity, is not merely ridiculous, but threatens, as Mr. Rumsey says, to become a public nuisance." Or again: "The death-rates, as usually calculated, are not expressive of facts, and cannot be accepted as valuable exponents of the sanitary condition of a place."

Of course, to the casual and unsophisticated reader, this would mean that the death-rates which the Registrar-General is accustomed to publish, and which have been and are so generally used in sanitary work, are a delusion and a snare: that, in fact, there is nothing to show to the contrary that the high death-rate may not be consistent with local salubrity and the low death-rate to local unwholesomeness. Of course, except as a question of speculative statistics, nothing of the kind can be intended. When Dr. Letheby describes the ordinary death-rates as "no longer expressive of facts," he means that the mere death-rate simply stated does not explain the different elements which go to form it, any more than the quotient of a sum shows the different combinations of figures from which it was obtained. He does not mean that the death-rate does not express the proportion of a certain number of deaths from all causes, registered in a certain locality, to the estimated population of that locality at a definite period at all ages. He uses the word "fact" in a peculiar signification which is not the common signification; and to expose the fallacy of this use as it runs through the address is an excellent exercise for the student of vital statistics. The assumption that those who have really to work seriously with mortality statistics accept mere death-rates as "ordinarily calculated" as "reliable exponents of the sanitary condition of a place," is much the same kind of statement as if it were to be said that persons who in a public meeting address

the "Chair," confound the chairman with the seat he occupies. There are persons who may thus misconceive death-rates and use them blunderingly, but this is another question.

The death-rate as ordinarily calculated is a starting-point of inquiry based upon records of mortality; and in practical work its use is to suggest directions of inquiry. In examining its meaning in any given inquiry, the different disturbing causes dwelt upon by Dr. Letheby come under consideration, but their influence is not unlimited, as might be inferred from his address. The results of observation come in here to check inferences from the death-rate; and the mean results of observation of many places with a high rate of mortality, and of many places with a low rate of mortality, show that the death-rates as ordinarily calculated, and within certain ranges, are safe approximative tests of the salubrity of places. It is possible that a person might blunder over a local death-rate swollen by the presence of a big hospital (notwithstanding the cautionary initial letters of the mortality returns), just as it is possible that a person might conceive that the mere death-rate of a big town, say like Leeds, could be reduced within the limits of the English Life Table by the elimination of the migratory population and the distribution of the death-rate in its several proportions among infants and young people; but we do not suppose that Dr. Letheby would think himself called upon to argue seriously with either person.

Take the influence of the birth-rate for example. Whenever this is high (as e.g. in the town we have mentioned), the death-rate is high also; and this alone, Dr. Letheby argues, would destroy the "sanitary value of the death-rate." Then of this relation of the birth-rate, we read "of the reciprocity of the numbers;" of Dr. Stark's opinion, founded on the Scottish mortality and birth returns, that "a high birth-rate is an effort of nature to compensate for the excessive waste of life in large towns" (that is to say, we presume, an effort of human nature when freed for the time being from the restraint of maintaining an infant); of the birth-rate being "the controlling element of the death-rate;" and also, as the Registrar-General has written, "wherever from the combined effects of intemperance, dirt, and bad ventilation and drainage, the mortality is greatest, there also the

ratio of births to population is highest," as if children were bred like maggots, when the community was most in a state of decay. However, we get at last a safe foothold in this slough of verbosity, when Dr. Letheby says, "the explanation of all this"—that is, the proportionate advance of death-rates with birth-rates—"is to be found in the fact that the mortality of infants is excessively high (46 per 1,000 in the first month of their existence, and 150 per 1,000 in the first year), and that it contributes very largely to the total mortality." Now, there is no constant relation between a high birth-rate and a large infantile mortality, and it is simple matter of observation that high rates of infantile mortality have very definite relations to local conditions of unwholesomeness. As Mr. Simon has written:—

"The death-rates of young children are among the most important studies in sanitary science. In the first place, their tender young lives, as compared with the more hardened and acclimatised lives of the adult population, furnish a very sensitive test of sanitary circumstances; so that differences of infantine death-rate are, under certain qualifications, the best proof of differences of household condition in any number of compared districts. And, secondly, those places where infants are most apt to die are necessarily the places where survivors are most apt to be sickly; and where, if they struggle through a scrofulous child-hood to realise an abortive puberty, they beget a still sicklier brood than themselves, are less capable of labour, and even less susceptible of education. It cannot be too distinctly recognised that a high local mortality of children must almost necessarily denote a high local prevalence of those causes which determine a degeneration of race."

These causes Mr. Simon divides into two categories—namely, first, those connected with common sanitary defects of residence; and secondly, those connected with occupational differences. The proportionate influence of these two sets of causes is not easily determined; but, as matter of observation, the value of the death-rate as ordinarily calculated, in indicating the probable salubrity of a locality, has depended very largely upon the recognition of the fact of the large proportion which the infantile death-rate bears to the general death-rate. This is the clue to the little maze into which Dr. Letheby has ingeniously cast the relationship of birth-rates and death-rates, and of the death-rates to infantile mortality, in their bearings upon practical inquiry.

The only novel illustration which Dr. Letheby furnishes of the untrustworthiness of death-rates, "so called," is based upon their remaining unaffected by sanitary progress.

"What more striking proof, indeed," he says, "can we have of the untrust-worthiness of the so-called death-rate as evidence of sanitary progress, than the remarkable fact that they remain unaltered, and, as it would seem, unaffected by such progress? Look on the enormously large amount of sanitary work which has been accomplished in London and in the large towns of England during the last twenty years; yet the death-rates remain the same. In the City of London during the last three decades the death-rates were 25·29, 24·94, and 25·11 per 1,000 of the population. In the whole metropolis they were 24·48, 23·86, and 24·14 per 1,000. In the large towns and town districts of England they were 24·45, 23·52, and 25 per 1,000, and in the whole of England they were 22·64, 22·11, and 22·69; differences which are insignificant when we consider how much has been done to improve the sanitary condition of the country."

Now, this is a question of fact, and does not lend itself so satisfactorily to his mode of argument as the more abstruse statistical questions previously discussed by Dr. Letheby. On the same question, the Right Hon. Lyon Playfair, M.P., said at Glasgow a few days before, and with more accurate data, as follows:—

"The first question which occurs is, Are we making distinct and satisfactory progress by our sanitary measures? The answer to that question depends upon our periods of comparison. If we go back far enough in the history of our country, there are distinct assurances of improvement. Suppose that we begin with the Restoration, although our earlier records relate to London only. For twenty years after the Restoration there was an exceptionally high mortality, even for that epoch, in the metropolis, and no doubt throughout the kingdom. Macaulay describes it as a time 'when men died faster in the purest country air than they now die in the most pestilential lanes of our towns, and when men died faster in the lanes of our towns than they now die on the coast of Guiana.' He was right, for the rate of mortality in London from 1660 to 1679 was no less than eighty in the thousand. What are the rates of death at various periods since then? The annual deaths from all causes per thousand of the population were: 1660-79, 80.0; 1681-90, 42.1; 1746-55, 35.5; 1846-55, 24.9; 1871, 22.6. If, instead of a single year, 1871, we take the average of thirty-four years, the existing death-rate in England is 22.4 per 1,000. Hence one gratifying fact comes out clear and palpable, that the death-rate is on the whole continually decreasing in this country, and that the chances of our lives are much better than in the days of our ancestors. If we restrict our view to the periods of the last two censuses, 1861 and 1871, we are at first disappointed by learning that the mean age of the whole population was exactly the same, 26.4, in both these years. and that the rate of mortality is only slightly different, two children out of 1,000 of the population being annually saved in the last year of the decade, while one more adult is cut off. But it would be a mistake to suppose that a stationary mortality necessarily indicates no improvement. The causes of mortality are increasing, and though the mortality remain stationary, there must be improvements in our hygienic arrangements to prevent the deteriorating action. There is a constant disposition among our population to congregate in towns and to leave rural districts. Hamlets become villages, villages are transformed into towns, and towns grow into cities. At the beginning of this century England

had no town except London with more than 100,000 inhabitants; now there are thirteen. There are 103 towns in England and Wales containing upwards of 20,000 inhabitants, and these 103 towns contain a larger population than the whole of England and Wales did at the beginning of this century. And as the rate of mortality is largely influenced by the density of population, the causes producing sanitary improvement must be at least equal to those of deterioration."

Dr. Letheby is right in stating that an enormous amount of sanitary work has been done of late years, but he is wrong in assuming either that the quantity or the quality has been such as would affect the general mortality of the kingdom in short periods. Great as the work is, it has been but partial as compared to local wants in vast districts of the kingdom. Where it has been of such nature as to affect the whole sanitary arrangements, there, as Dr. Buchanan has shown, the death-rate has been markedly lessened. Where it has been only partial (as, for instance, in some great northern towns, where a water-supply and system of drainage has been introduced, but the old, abominable privy-system continued, and other evils have remained untouched), there no such lowering has occurred.

Judging from the effect of thorough sanitary work upon certain local death-rates, as well as from observation in towns not so favoured, the proper inference is, as to stationary or increasing death-rates elsewhere, that this arises partly from the effects of the work being masked by the migration of country people to towns, partly by the inadequateness of the works to meet the sanitary needs of the population.

APPARENT AND REAL CAUSES OF ENTERIC FEVER.

Two epidemics of enteric fever have somewhat recently been the subject of official inquiry in Yorkshire, and they are both worthy of record, not only on account of the somewhat unusual circumstances under which they were ascertained to have spread, but also because they clearly show that before we accept any one condition as having been the cause of the prevalence of an infectious disease, we should, however plausible and con-

vincing it may at first sight appear, invariably subject it to a careful and scientific examination in all its bearings.

The first epidemic took place in the village of Clayton-West. near Huddersfield, and although, before the termination of the outbreak, scattered cases of the disease had appeared in various parts of the village, yet, after the occurrence of the first case, a small block of cottages known as Square Fold became the seat of the disease, and it was here that the epidemic was principally centred. When the first case arose, complaints were made as to the water-supply of the village; samples were taken from some of the most frequented wells, and amongst these from one which supplied Square Fold; they were subjected to chemical analysis; they were all found to be seriously contaminated and to be quite unfit for domestic use; and the wells were, in consequence, closed. When, therefore, the disease spread and the inhabitants of Square Fold were attacked, the conclusion was at once very generally arrived at that the outbreak was due to a polluted water-supply. But although the use of the contaminated water had for some weeks been abandoned, the epidemic gave no signs of abatement-indeed, it subsequently increased rapidly in intensity, and at last an application was made to the Local Government Board for the aid and advice of one of their inspectors. An inquiry was then instituted by Dr. Thorne Thorne, and the results of his investigations were communicated to the sanitary authority of the village. point which was at once elicited was, that the first case could not have been due to polluted water; for although the well attached to the patient's house in all probability received soakage from an adjoining burial ground, yet its contents had been used by a considerable number of persons who had all along remained in health, and the patient himself had evidently procured his supply from an entirely different and a wholesome source. Indeed, his was apparently an imported case. So also, when the circumstances attending the virulent outbreak in Square Fold were examined by the aid of the knowledge we have already procured concerning enteric fever, the theory of water-pollution as the cause of the outbreak could not be maintained; for not only had the polluted water not been used by several of the persons who were amongst the first attacked,

but the period which had elapsed between the closing of the suspected well and the outbreak of the disease considerably exceeded that which previous experience has shown to constitute the period of incubation in enteric fever. It was then ascertained that the first patient's linen, saturated as it had been with his specifically poisoned evacuations, had been washed in a small wash-house in Square Fold, and that all the liquid refuse and slop-water from this place passed into an old stone drain, which was so imperfectly constructed as necessarily to favour the stagnation and the decomposition of its contents. With this drain every cottage in Square Fold was connected, the connection being effected by means of pipes passing directly from the slop-stones into the drain, without the intervention of any trapping or other means by which the entrance of sewer air into the dwellings could be prevented. Indeed, no system could have been devised which would more effectually have tended to foul the air breathed by those inhabiting the cottages in Square Fold. The poisoned linen had been first brought to the wash-house towards the end of May last, and by the middle of June two cases of enteric fever had occurred there. Other cases speedily followed, and within a short period, only seven out of a total of fourteen houses which were connected with this specifically poisoned drain had escaped the infection; entire families had been attacked; and there was no evidence that the epidemic had as yet expended itself. The history of this outbreak affords additional interest when viewed in connection with the recently expressed opinion of the Local Government Board, to the effect that slop-water may be admitted into watercourses. In Square Fold the means of excrement disposal in use is stated to be the midden-privy, and the drains therefore only receive from the houses that which is commonly termed slop-water. But had this special drain emptied itself into one of those numerous watercourses, the contents of which are used for drinking purposes, a far larger amount of disease and death than that which actually occurred would almost certainly have been the result.

The second case to which we would refer occurred at Bierley Lane, a hamlet situated about a mile outside the borough of Bradford. In this instance, it appears that some land in close

proximity to the hamlet was, during the month of May last, irrigated with liquid refuse from a knacker's yard, and that on or about the 16th of the month the odour arising from this process was all but overpoweringly offensive. Loud complaint was made as to the nuisance thus caused, and the process of irrigation was stopped. But during the last week in May, that is to say within from ten to fourteen days of the date when the irrigation nuisance was at its worst, enteric fever broke out; it steadily spread in almost all parts of the hamlet, and it was still prevalent at the date when Dr. Thorne Thorne held an inquiry there. That the means of irrigation adopted at Bierley Lane. and the outbreak of enteric fever, were related to each other as cause and effect, admitted of no doubt in the minds of the inhabitants; and this conviction was strengthened by the fact that several persons who had been most affected by the foul odour complained of had also been amongst the number of hose who had suffered most severely from the fever. When, lowever, the circumstances of the outbreak were fully ascerained, it became evident that the cause of the disease was widely different from that to which it had, by popular rumour, The first case had occurred at a small dairy peen ascribed. quite removed from proximity to the irrigated land, and it had been followed by two others in the same house. Whilst the lairyman himself was ill, his wife nursed him, and she also at the same time milked the cows, and in every detail attended to the storage and the sale of the milk; when the wife sickened, the husband, in his turn, performed the duties of dairyman and nurse, and the attendant circumstances left no doubt but that there were many ways in which the milk could have become 3 pecifically polluted. The hamlet consists of eighty-seven houses, and the occupants of thirty-eight of these procured their milk from the dairy in question. Of these thirty-eight houses, Enteric fever, up to the date of the inquiry, was ascertained to have prevailed in twenty-three, or in other words in 60.5 per **3ent.** of the whole; whereas of the remaining forty-nine houses not having this milk supply, eleven only, or 22.4 per cent., had been attacked. So also the cases occurring in these eleven ouses mostly took place late in the history of the epidemic, when there had been ample time for the general poisoning of

the atmosphere through the agency of the neglected middensteads and of the foul drains with which the hamlet is provided. And further, whereas there were numerous instances in which several members of the same family were attacked amongst those using the milk from the affected dairy, yet in only two out of the eleven houses not having this supply did more than a solitary case take place; a circumstance which bears out the experience previously gained, and which tends to show that when the poison of enteric fever is received into the system by means of any fluid drunk, a larger proportion of persons are, as a rule, attacked with the disease than is the case when a corresponding number of persons are exposed to the influence of the poison in an aërial form, as by the inhalation of specifically polluted sewer emanations. It was further ascertained, that although out of a row of ten cottages immediately adjoining the irrigated land, enteric fever broke out in four, yet the families residing in three out of the four procured their milk from the affected dairy, and in no single instance did the disease appear in this row until at least twice the ordinary period of incubation for the disease had elapsed since the date at which the process of irrigation was last carried out.

Thus, in both these instances, a circumstance which at first sight seemed to be clearly associated with an outbreak of enteric fever was ascertained to have no connection with it; and in both epidemics recorded, the want of proper precautions in dealing with the poisonous evacuations of isolated cases of the disease led to the production of outbreaks of considerable magnitude.

THE PRACTITIONER.

DECEMBER, 187

Original Communications.

MEMORIAL NOTICE OF DR. ANSTIE.

In the belief that it may gratify our readers to learn how highly the estimable qualities of the late Dr. Anstie were appreciated by his professional brethren in America, we print the following brief memorial notice of him, forwarded to us by the secretary of the society before which it was read.

At a meeting of the New York Society of Neurology and Electrology, held on the 19th of October, the following obituary notice of the late Dr. Anstie was presented:—

"FRANCIS EDMUND ANSTIE, M.D., F.R.C.P.

Obit. September 12, 1874.

"Few foreign names are better known in America than that of Francis Edmund Anstie, whose untimely death on the 12th of September has robbed this society of one of its most valued corresponding members. Graduated in medicine from the University of London in 1858, his talents and energy soon gained precessional recognition, and as early as 1861 he became Assistant Physician and Lecturer on Materia Medica and Toxicology at Westminster Hospital, wherein at the time of his death he was Physician and Lecturer on Medicine. Every neurologist s of course familiar with Dr. Anstie's various contributions NO. LXXVIII.

to the literature of the neuroses; these and his researches in the action of stimulants and narcotics are already ranked among the classics of our profession. His more recent labours. not yet so generally known, were engaged in experimentation on the excretion of urea under different pathological conditions—but few of the results of which have as yet been published—and in an elaborate investigation of the physiological action and dietetic position of alcohol, which promised to be of the highest practical value towards the solution of this much-disputed question. The first instalments of this inquiry, it will be remembered, were lately published in the Practitioner, absolutely disproving the commonly accepted idea that any considerable proportion of ingested alcohol is excreted unchanged; and in a letter written but a few weeks before his death he stated that he was pursuing a further series of careful observations of the effects of alcohol on carbonic acid expiration, after which he purposed a thorough research into the different physiological actions of amylic and ethylic alcohols.

"But it is not alone on account of his scientific industry that Dr. Anstie's loss will be mourned and his memory cherished. All who knew him speak with equal fervour of the admirable benevolence of character which distinguished him as a philanthropist aside from his fame as a physician. Ever sympathising with the sorrows of his poorer brethren, ever ready to relieve their suffering, ever active in seeking to redress injustice and to reform abuses, he leaves a name loved and revered by the mass of his countrymen, as it is honoured by the profession throughout the world. His death, occurring at the comparatively early age of 41, was the result of a wound received whilst making a post-mortem examination. Erysipelatous inflammation and pleuro-pneumonia supervened, and proved fatal within a week from the date of the injury.

"A movement has been inaugurated by the leading professional men of England to establish a memorial of Dr. Anstie's public and scientific services, and it is to be hoped that the profession in America will claim the privilege of contributing towards a testimonial to the memory of one whose life was an example of all that the true physician's should be, and whose death was a martyrdom in the cause of science."

ON JABORANDI.

BY SYDNEY RINGER, M.D., AND ALFRED GOULD, M.B., UNIV. MED. SCHOL., L.R.C.P.

Idrug, a native of the interior of Brazil, brought thence by Dr. tinho, of Pernambuco, has lately attracted considerable attenin Paris. It consists of the leaves and small branches of rub which possesses an agreeable and somewhat powerful natic odour. Dr. Gubler and M. Rabuteau confirm Dr. inho's statement concerning its powerful diaphoretic and gogue properties. The dose is from 30 to 90 grains infused siling water. The patient should drink the infusion with the ended leaves, then go to bed and cover himself with warm ning.

- . Rabuteau took about 43 grains, and in ten to fifteen ites his forehead became moist; and soon the sweating me copious and was accompanied by abundant salivation, in continued nearly two hours. The sweating and salivation iltaneously declined in about one hour and a half. Somes the sweating continues four or five hours, and is often emely profuse. It is said, too, that the bronchial secretion icreased. Dr. Gubler says that this drug sometimes prosed diarrhoea.
- r. Martindale, of 10, New Cavendish Street, was fortunate 1gh to obtain some of this interesting medicine, which he 1ly placed at our disposal. We made four experiments on e healthy lads, with a slight exception to be noticed further of ages varying between 8 and 12. We gave 30 grains of infused drug with the dregs, and kept the lads in bed

covered with their usual amount of bed-clothes. We carefully examined the effect of the medicine on the sweating, salivary and bronchial secretions, the pulse, respirations and temperature. The lad on whom two experiments were made was slightly feverish; that is to say, on one day his temperature rose to 99.6° in the rectum, and on the next observation 99.4°. In two of the experiments the temperature was taken under the tongue. In the other two, both on the same lad, the temperature was taken in the axilla and the rectum.

It will be noticed that the results of our observations differ in some slight but unimportant particulars from those of the French observers. In three instances the drug produced perspiration; one lad's skin remained quite dry throughout the experiment. In two of the lads, perspiration set in in ten to fifteen minutes, in the third case it was delayed for thirty-five minutes, becoming profuse in from twenty to thirty-five minutes, and continuing thus from thirty minutes to an hour and a half, and then remaining slight from two to four-and-a-half hours. There was some salivation in all the experiments, and in two cases it was profuse; but in the lad on whom two observations were made the effect on the salivary glands was very The salivation was much more profuse in the lad whose skin remained dry. The salivation, when it occurred to a marked extent, began simultaneously with the sweating, was greatest when the sweating was most profuse, and lasted as long as the sweating. When the increase of the saliva was but slight, it was difficult to tell where the increase began, and how long it lasted. In the case of the lad who failed to perspire, the salivation became profuse in fifteen minutes, and so continued during three hours and a quarter, and then in a less We noticed an increase of the degree for seven hours. bronchial secretion, indicated by a loose cough, only in the lad, previously quite free from catarrhal symptoms, on whom two observations were made, and in whom but a slight increase of salivary secretion occurred. The bronchial secretion was much more abundant in the first than in the second observation; indeed, in the second there was very little cough. In each observation a decided fall in the temperature occurred. In two cases accompanied by sweating the fall amounted to 1° Fahr

and in another, likewise accompanied by sweating, it reached 2.6°; but as this observation was begun in the afternoon and continued until the evening, it is impossible to tell the proportion of the fall assignable to the medicine and to the natural diurnal fall which, in children of 10 to 12, usually begins between four and five o'clock.

The reduction of the temperature persisted for the rest of the day, but in the two morning observations the lowest temperature was reached about an hour and a half after the administration of the medicine.

In one case the fall began immediately; in another case in forty minutes; in another instance in eighty minutes.

In the lad whose skin remained unperspiring there was a fall of 0.6°, which, beginning forty-five minutes after the administration of the medicine, lasted only two hours and a half.

In each experiment the pulse became considerably quicker, the increase varying from forty to fifty beats. The pulse reached its quickest in from twenty-five minutes to eighty minutes after the administration of the medicine. The quickened pulse continued more than four hours. No close relation existed between the rapidity of the pulse and the fall of temperature. The medicine caused the heart to beat against the chest with increased force, and produced distinct throbbing of the carotids, and the pulse became full and quick. In one lad, whose pulse was intermittent, the medicine entirely removed this irreguarity.

In those instances in which sweating took place the face became flushed, and was most marked when the perspiration was greatest. The flush involved the cheek and the ears; but oon it passed away and was succeeded by pallor, yet the perpiration continued very free.

In three cases the medicine produced considerable drowsiness, the lad falling asleep during the observations. They vere also a little sick, faint, and prostrate. The lad who failed o perspire, vomited. The perspiration therefore was not due to he nausea, nor indeed did they complain of it. The vomiting ame on suddenly, and was not repeated.

To sum up our results:—In three out of the four experinents, jaborandi caused copious perspiration. In one lad the skin remained quite dry, affording an interesting evidence of the effect of idiosyncrasy; for on the same day, in the same ward, the same dose was administered to both lads, placed under the same conditions, yet, whilst one sweated profusely, the skin of the other remained dry.

Jaborandi acts as a sialogogue, causing in some a very great flow of the salivary secretion; but its sialogogic is less uniform than its diaphoretic action.

In one case only did it increase the bronchial secretion.

Jaborandi considerably accelerates the heart's action and renders the arterial impulse more visible; but whether this is due to increased force of the heart's action, or to relaxation of the arterial system, our observations were not exact enough to determine.

In each observation the temperature fell considerably. Now this fall is not due to the natural diurnal changes, for by other experiments we have ascertained that between 9 A.M. and 4 P.M. the temperature remains remarkably constant; and that when it does vary between these hours it generally rises. The action of jaborandi on the skin affords the most plausible explanation of the fall of temperature. We have seen that it causes flushing in the face, and probably therefore increases the flow of blood to the skin generally, and induces profuse general per-These two circumstances must cause loss of heat, by increased radiation and vaporation. Against this view, however, it must be stated that in the case of the boy whose skin remained dry, a decided fall of temperature occurred. It may be said that in this case there was increased insensible perspiration, which somewhat reduced the temperature; that, in fact, jaborandi did affect the skin, but to an extent insufficient to render the perspiration visible. Moreover, the fall of temperature was less and lasted a much shorter time than in the cases where the perspiration was copious. In the lad with the dry skin, as there was no flushing of the face, there was probably less determination of blood to the skin than in the other lads.

In all the three lads the drug excited vomiting, but with scarcely any nausea. It produced drowsiness, which supervened soon after the flush disappeared from the face, when the skin became very pale, and a little prostration set in. The per-

spiration continued profuse long after the flush had left the face and ears.

One unexpected result was obtained. In the lad who was subjected to two experiments, the temperature was taken in both axilla and rectum; and the axillary temperature during part of the observations was higher than the rectal; and, though frequently tested, on no occasion did the rectal temperature exceed The thermometers were compared and found to be exactly alike. This fact is certainly singular. occasions one of us made numerous observations regarding the rectal and axillary temperature, and found that in many people, if proper care was taken, the axillary temperature was as high as the rectal. This statement is opposed to Dr. Parkes's observa-It would appear, however, that in this respect there are individual differences. On no occasion was the temperature depressed below the limits of health.

It has been asserted on high botanical authority that jaborandi is composed of the leaves and small stems of a rutaceous plant, the *Pilocarpus pinnatifolius*. Mr. Martindale obtained a fresh specimen of this plant from Kew Gardens, dried the leaves, and we administered 30 grains, as an infusion, to a lad about twelve years old; but the drug produced no effect. It may be that when grown in this country the plant fails to develop its active medicinal properties. Moreover, the *Pilocarpus pinnatifolius*, when dried and powdered, did not possess an odour like that of jaborandi. Mr. Martindale, so well and justly known as a pharmaceutical authority, and who has published a paper on this subject in the *Pharmaceutical Journal*, considers that the plants are not identical.

CALCULOUS DISEASE OF THE KIDNEYS. CALCULOUS PYELITIS.

BY W. R. BASHAM, M.D.

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CALCULOUS disease of the kidneys is the major result of lithuria. The previous existence of a lithuric state, with more or less evidence of lithuria, is the invariable and necessary origin of calculous disease. In many this antecedent or precursory stage is overlooked—just as the premonitory symptoms of gout may be overlooked or unnoticed; for gout is the very essence of lithuria. It is the precipitation in certain tissues, chiefly fibrous and cartilaginous, of the lithic acid in combination with soda. So in calculous disease, the lithic acid precipitated, in the absence of its alkaline solvents, from the blood, either as an oxalurate, and then combined with lime as an oxalate, or as pure lithic acid in amorphous masses or in crystalline grains, is detained in the renal tubes, from whence it may be washed out with symptoms of nephralgia, or still retained, slowly increasing by the accretion of similar particles, and at length setting up & group of symptoms which in their aggregate constitute the indication of calculous disease. The most characteristic starting-point in these cases is slight and perhaps scarcely, except by microscopic aid, appreciable, hæmaturia. In some the hæmaturia is palpable and startling the patient with alarm; in others, the presence of blood may only be suspected by the observant eye, and this well-formed suspicion only verified by microscopic examination. The state of kidney which gives rise to these attacks of hæmaturia is certainly not of an inflammatory character.

no constitutional disturbance. The attack is mostly unexpected, occurring, in many cases, without any warning, oftentimes apparently induced by some bodily effort. Horse exercise, or similar jarring physical acts, a jump, the jolting of a carriage over rough ground, have severally been referred to as the apparent exciting cause. It has been already stated that nephralgia, lumbar pain, frequency of micturition, and the occasional presence of crystalline grains of lithic acid in the urine, may indicate a disposition to calculous disease; but it is not till one or more attacks of hæmaturia have occurred that the proof is reached of a stone or gravelly matter being lodged in the kidney. Further proof may now be found in the occurrence of specific sympathetic sensations in certain nerves intimately associated or connected with the renal plexus of nerves; aching pain in the crest of the ilium; pains across the loins of a character similar to lumbago, only that in the latter disorder the pain is excited chiefly by motion, or muscular effort necessary for change of position, while the lumbar pain in renal calculus is unaffected by motion, and is dull and continuous when it is present. The external crural cutaneous nerve of the thigh often exhibits special alteration in relation to cutaneous sensibility: ordinary sensation is exchanged for singular errors of sense-not confined, however, to the limits of the distribution of the fibrils of this last-named nerve, but occurring in other parts of the skin surface of the lower extremities.

These alterations in the cutaneous sensibilities are often expressed by the statement that the skin feels as if wrapped round with moist cold cloth. Sometimes the idea of warmth is experienced, such as the patient may liken to a stream of warm air blowing on the skin. The testicles may be drawn up, and a peculiar aching of the cord may exist. In many, as this disease progresses, an uneasy, even painful sense is felt at the extremity of the meatus urinarius, urging to frequency of micturition; quickly relieved by voiding urine, but returning with the presence of even a few ounces of urine in the bladder. At this stage the urine is rarely passed clear; mostly turbid, either from small quantities of blood or from a disproportion of mucous corpuscles. The microscopic character of the urine at this stage is very characteristic, and may be said to be typical of

calculous disease of the kidney. The urine is slightly turbid: the colour, brownish yellow, or, in proportion to the extent of blood, reddish or pinkish. In a few hours, set aside in an appropriate urine glass, it settles and separates into a distinct sediment, the upper portion becoming proportionately clear. When the amount of blood is small, the sediment may be seen composed of two layers: the lowest consists of mucous or exudation corpuscles, floating, and above these is a pinkish or red layer of blood-corpuscles. The lower layer of mucous corpuscles is colourless, but there may be seen precipitated to the very bottom, in some cases, small amorphous masses of sand or gravel. This stage of the disorder is essentially the earliest one capable of diagnosis, or of recognition as arising from calculous matter in the kidney. It is the hæmorrhagic stage, insensibly passing into the mucous stage, preliminary to the development of the purulent stage, or that of renal abscess. scopic examination of the urine, after settling, exhibits the following objects:—The pink layer is composed of isolated bloodcorpuscles. They are never seen in rouleaux, or even grouped; they are scattered among the mucous corpuscles, and this pink stratum includes the greater number. In the lower stratum of mucous cells, only here and there a few blood-discs are intermingled, the field being chiefly filled with large-sized exudation corpuscles, mono-nuclear for the most part; many, however, presenting the nucleus more or less reniform, as if in a preliminary stage of subdivision; a few may exhibit a tri-nuclear appearance, rendered clearer by the addition of a little acetic acid. The other objects usually seen are amorphous masses of lithic acid. The crystalline forms are not common at this stage; and crystals of oxalate of lime, although occasionally present, are at this stage not usual. Squamous epithelium from the urethra or bladder may be seen; but these cells are common to almost all urinary sediments. Large oval mono-nuclear cells, the protective epithelium of the ureters and pelvis of the kidney, are also visible in greater or smaller number, and indicate an irritative action in the calyces and infundibulum, and thus are distinguishable from those formed in the renal tubes or parenchymatous part of the kidney. They are presages of the probable commencement of an ultimate stage of the disease,

calculous pyelitis, the symptoms of which will be described hereafter.

The explanation of these attacks of hæmaturia may be offered as follows:-Post-mortem examinations have demonstrated that not unfrequently there may be lodged in the straight tubes of the cones deposits of lithates, or even crystalline particles of lithic acid, or crystals of oxalate of lime. They are seen as marking a distinct and visible deposit in one or more of the tubes when a section is made through one of the mammillary They give a streaked appearance to the cone, the tubes blocked by these matters looking pale or even resplendent against the light. The nature of this deposit has been determined by analysis, as well as by the microscope. In many instances, doubtless, this deposit is only temporarily a cause of irritation. It is driven forward by the urinary current and washed out by the urinary stream, and, as sand and gravel, appears as a sediment in the voided urine. In other cases, however, if carried out of the renal tubes, the material may be detained or lodged in some recess of the calyces, and then by slow accretion increases in size; and, according to its composition or by the nature of the succeeding layers added to its surface, remains and forms as it were a home for itself, becomes perhaps encysted, and is lodged permanently within the sulcus of the kidney: or, if it escapes into the infundibulum it may pass down the ureter, accompanied by marked and most characteristic symptoms, into the bladder, from whence it may be voided through the urethra, and thus happily terminate in a spontaneous relief. This favourable result happens only when the calculus has not exceeded a certain size, and when its composition is either oxalate of lime or lithic acid, or the former constituting a minute nucleus, with concentric layers of lithic acid superimposed. Such a calculus, to bring it within the probability of spontaneous escape, rarely exceeds in size a small pea. In women such calculi may become as large as a lentil or small haricot bean, and yet obtain their escape through the larger capacity of the female urethra. The writer has in his collection two that are of the size of a small white haricot bean, passed at intervals of many months, from a female patient.

In all similar cases there is one clinical fact that should not be overlooked, and which may account for the escape of some

calculi and the hopeless retention of others. So long as the irritation set up by these calculi is little more than simply hyperæmic, relieved by the escape of blood occasionally, and the urine is charged with mucous exudation corpuscles only in a very moderate degree, and if the lithates in the urine are absent or very scanty, the calculus will increase by the addition of fresh layers of pure lithic acid, the growth will be slow, and the surface remain smooth—a condition essential to a spontaneous escape. But let the urine be loaded with lithates, let the irritation excite a blennorrhagia of the mucous surfaces of the calcyes, and such an amount of mucus is excreted that at first lithates are rapidly deposited on the surface of the renal calculus; its growth is thus accelerated; and further, this abundance of organic material excites molecular change in the urine passing over the calculus, and now, in addition to layers of lithates, external with the outermost layer of lithic acid, we find these layers either alternating with the layer of the triple phosphate, or in some cases formed exclusively of this latter. These changes not only increase the volume of the calculus to a size which is unfavourable to its escape, but the addition of the lithates and mixed phosphates induces irregularity of surface; and in place of a smooth, or at most a slightly granular surface, the outermost layer adapts itself to the spot in which it rests, and often forms a kind of mould of the space in which it grows. It thus becomes permanently lodged, growing slowly, moulding itself to the interior of the pelvis of the kidney, and at first partially, but eventually completely, blocking up the entrance to the ureter, and thus gradually developing the symptoms and the condition known as calculous pyelitis. The subject of calculous pyelitis will be discussed hereafter, and it will become an important point to consider the differential diagnosis between this form of renal disease and tubercular or scrofulous pyelitis.

It has been stated that the amount of mucus in the urine in cases of renal calculus is a point of considerable practical importance; for so long as its amount is moderate, and the character of cells composing it mono-nuclear, with here and there a multi-nuclear cell (Gluge's corpuscle), there is little apprehension of any rapid increase of the calculus, and consequently up to this stage a possibility of the escape of the calculus from

its prison-house in the kidney. It is always desirable in cases of renal calculus to hold out to the patient the possibility of such an occurrence, at the same time making known the character of the symptoms by which this escape may be recognised. This also serves the purpose of lessening the alarm which the patient may feel at the very urgent symptoms which usually accompany the descent of a calculus down the ureter. To the aggregate of these symptoms the very appropriate name of renal colic is applied. Usually without any special previous warning-saving, perhaps, some lumbar pain, or the aggravation of some of the previous symptoms, such as increased pain and uneasiness at the neck of the bladder—a sudden pungent griping pain occurs, with urgent but ineffectual efforts to void urine, for the bladder is usually empty. This paroxysm of pain is at first of short duration, but it is soon succeeded by fresh paroxysms, with a sense of deathlike faintness; more and more urgent the anguish increases; the body literally writhes with pain; posture after posture is assumed in seeking mitigation of the cruel griping colic. The face and forehead become drenched in sweat. Nausea at first, becomes developed into vomiting; and it occasionally happens that after the first full act of vomiting, a temporary lull in the tempest of suffering follows. The patient eagerly seeks the recumbent position. During this tumult the respiration and circulation are only so far affected as they are related to violent efforts of straining, when the glottis is momentarily closed and the diaphragm and abdominal muscles fixed. So soon as the paroxysm of colic abates, the pulse and respiration become quite natural. The period of rest varies much: in some a day or two may elapse before a second, in others the attack is repeated after a very short period of remission. In these latter, after two or three of these paroxysms a complete interval of rest follows, and for a day or two nothing occurs to engage the patient's attention, except it may be that such measures of treatment may have been adopted as to leave some mark of their effects; and this is particularly so, if large doses of opium have been taken to alleviate the colic and relax the spasm of the In some future observations on the treatment of this form of renal distress this point will be further discussed.

The next phase of this form of calculous disease is usually of

short duration, but nevertheless causing a momentary alarm and suffering on the part of the patient. It must be remarked here that this paroxysm of colic marks the descent of a calculus down the ureter from the kidney. Now, it may happen that weeks and months, even longer, may follow without any indication of renal or urinary disturbance, till a group of symptoms rise up which tell beyond doubt that the bladder has become the home of the calculus. But very many cases of renal calculus, particularly those belonging to the type just described, never suffer from stone in the bladder. The sequel to the renal colic is as follows, and the writer is in possession of twelve renal calculi from as many patients, which were voided with symptoms almost identical in each: all had suffered from antecedent renal colic :- On passing water the patient suddenly feels an obstruction to the passage of urine through the urethra-Urgent straining follows. Great pain and alarm, with a sickening feeling of nausea, are not unusual. After a short interval the obstruction suddenly gives way, and the urine bursts forth with a rush, and if fortunately the event happen when the patient is using a chamber-vessel, a smart ringing sound of something solid falling enables the patient to recover the calculus which has so long been the cause of all his distress. In women, the passage of a calculus through the urethra is not accompanied, except the stone be unusually large, by anything like the suffering experienced by a male patient. Such a favourable termination of stone in the kidney is by no means rare, and the probability of the recurrence of the disorder depends greatly on the chemical composition of the calculus; it is therefore of the last importance for a correct prognosis that this characteristic of the calculus be correctly ascertained by analysis. The following conclusions may be safely relied on :-If the calculus be oxalate of lime, either chiefly or solely, it may be concluded that it is unaccompanied by others—in fact, that it is solitary; and the probability of the recurrence of the disorder reduced to 8 minimum. Experience justifies this prognosis. If, on the other hand, the calculus be composed of lithic acid, pure or mixed with lithates, it is almost certain that either there are others ready to follow the first, or at any rate that the material for their formation is in existence, and that sooner or later the

recurrence of the disease may be expected. Hence, an important clinical induction follows, that in the lithic acid diathesis, those dietetic and therapeutic measures which experience teaches are the best alleviations must be unremittingly continued, or at any rate should be frequently employed, especially on the slightest sign of disturbed renal secretion. In the oxalic diathesis this is less needed, for the recurrence of calculus in the kidney when pure oxalate of lime concretion has been passed is extremely rare.

It is proposed in a subsequent article to consider the pathology and symptoms of calculous pyelitis, with observations on the most appropriate treatment for both calculus in the kidney as well as calculous pyelitis.

THE MANAGEMENT OF DELIRIUM.

BY J. MILNER FOTHERGILL, M.D.

THERE are few more complex problems put before the practitioner than how to conduct the treatment of a case of delirium. Not rarely the problem is brought somewhat abruptly before Whether so suddenly presented to him, or its advent has been foreseen for some days, it is always accompanied by points of difficulty. In this respect, each case differs somewhat from every other case, and there are peculiarities in each and every one. In order, then, to meet such cases with a fair attention to their needs, the first thing requisite is a pretty clear comprehension of delirium as a whole. The next thing is to supplement this general knowledge by attention to the exigencies of each individual case. The latter, it is obvious, is a matter which must rest on the knowledge and good sense of the practitioner, and his allies, the nurse and the friends of the patient. Little can be done here. The first, however, is 8 matter which may well engage our attention.

Delirium manifests itself under various circumstances. It is not by any means a matter of indifference what these circumstances are, as giving indications for treatment. Delirium may be induced by sthenic conditions, as when it is causally associated with meningitis. It may mark exhaustion of the cerebral cells, together with general adynamy, as in delirium tremens. It is obvious that the treatment of delirium under these different circumstances must be varied according to the indications. Then, again, delirium is very common in the pyretic affections of childhood, not only in the more advanced stages, but in the

commencement of the ailment. The younger the child, and the more emotional its temperament, the more readily are the evidences of disturbed cerebral action evoked. There is, however, as much difference betwixt the delirium of the commencement of a febrile attack in a child and that of advanced typhoid conditions in the adult, as there is betwixt the delirium of meningitis and delirium tremens. When delirium comes on in the latter stages of continued fever, it is usually accompanied by other evidences of an impure condition of the blood, as subsultus tendinum and muscular prostration. When it shows itself in the exanthemata, there is not usually such a wasteladen condition of blood as to occasion those marked evidences of its effects upon the cerebral centres, and the delirium is probably associated with the effects of the fever poison.

We may now proceed to consider the changes which are the physical side of the question. In delirium, there is a modification of the functional activity of the cerebral cells. In meningitis there is an active and violent condition of delirium, together with strong muscular movements. There would seem to be an exalted condition of the cells of the grey matter to such an extent as to disturb the equilibrium ordinarily existing, and so to institute an escape from the control of the will. In delirium tremens, the condition is more commonly that of exhaustion of the cerebral cells from the sustained alcoholic stimulation to which they have been subjected. There is that excitability and irritability which are the precursors of exhaustion in nerve matter. In the case of children, a slight rise of temperature is commonly sufficient to institute an irregular action in the cerebral cells, which becomes manifest in incoherence and rambling. The delirium of the typhoid condition, and especially when associated with specific fever, is the result of excited cerebral action, leading to exhaustion, combined with an impure state of the blood. In the acute delirium of the exanthemata, there would appear to be a certain amount of cerebral hyperæmia. together with the effect of the poison upon the cells of the grey matter.

In all these cases, and doubtless equally in the other less common conditions which furnish delirium, there is an irregular or exalted action of certain cerebral centres, together with a NO. LXXVIII. diminution of the controlling forces ordinarily in action. That balance and harmony which normally exists in all, to a greater or less extent, is disturbed by certain physical conditions, and then irregular cerebral action results. In children, where there is much more mobility than is normal in adults; not only is delirium readily induced, but irregular muscular movements, or convulsions, are common, indicating disturbance in the motor centres. In adults, too, there is a wide difference in their respective proneness to delirium.

The emotional mobility and ready excitability of one person, indicating an unstable equilibrium, contrast with the well-controlled cerebral action in others where reason is rarely and but with difficulty unseated. Much slighter causes of disturbance will excite delirium in the first-named; great and sustained disturbing action is necessary to induce it in the latter. When, however, the brain is kept for some time at a high temperature, and fed by impure blood, its excitability is much increased, and its equilibrium is very apt to be overthrown.

These last are the conditions under which we find delirium usually induced; and it is with delirium so associated that the present consideration chiefly deals.

For the proper comprehension of the measures required for the management of delirious patients, some review of delirium from its psychological side is clearly indicated. There has been little scientific attention paid to delirium, and there has little attempt been made to comprehend and unravel the workings of the mind in this state. It is common enough for medical men to have delirium when seized with fever, but unfortunately a Very few care to analyse their very large proportion die. sensations or their remembrances of a delirious past, and consequently there is but little in our literature which tells us of the attitude of delirium from the patients' point of view. It is chiefly from the stand-point of the careful clinical observer that we can look at delirium. Experience soon tells us that delirium is not what unprofessional people imagine—namely, an upheaval of hidden thoughts-of thoughts associated with fears and dreads, which then manifest themselves openly, escaping from the weakened control of the ruling centres which ordinarily restrain them from outwardly indicating themselves. All that

is carefully hidden does not ordinarily escape in delirious raving, though the more such matter obtrudes itself in the consciousness in health, the more likely it is to reveal itself when the will is laid in abeyance by disease. The evil conscience may keep the prospect of delirium and its revelations before the possessor of a guilty memory; and it is no great evil if it does But the material of raving thought is chiefly the objects upon which the mind ordinarily dwells. The bricklayer's mind wanders amidst bricks; the medical man commonly wishes to visit his patients; the soldier's thoughts turn to the grim matters belonging to his avocation. But maidens do not mutter their lovers' names nor men their liaisons in preference to anything else. Delirium is but a modification of our ordinary thought; frequently it is little more than incoherent thought. At other times the imaginative centres may be active, and, instead of a day-dream, the fancies are expressed in words. More frequently, however, delirium is immediately excited by disturbed or imperfect impressions coming in from the periphery, or from some idea occasioned by what is seen or heard. unstable brain is easily perturbed; and if the eve sees but imperfectly, or does not recognise readily the object seen, then a flood of erroneous ideas is inaugurated. If the eye falls upon unwonted objects or an unfamiliar aspect, then a direction is at once given to the wandering thought.

Nothing is more common in a delirious patient than a fixed determination to escape from his bed and from the apartment which he occupies. Again and again have fever patients to be strapped to their bed, in order to prevent them from injuring themselves in attempts to get away. No amount of watchfulness, which is feasible, can be given to their unintermitting aim of escape. But why do they want to get away? Why does the delirious patient in private practice give so much trouble, and require incessant watching? Because, like the insane patient, he wishes to get home!

When the brain is wandering, and reason no longer rules, the prevailing desire is to get away to familiar scenes and wonted surroundings. The mind craves for its usual associations of ideas as to locality and neighbours. Consequently, when the delirious patient wakens up in the fever-ward, there is nothing

on which his eye may rest with which it is familiar, or which helps the wandering brain to collect its erratic thoughts. ruling idea is to get home; and a very natural idea it is. Every sick person craves ardently to be at home amidst relatives and friends; and in delirium the craving commonly takes the direction of an attempt to get away home by immediate escape from the room occupied at the time. It is no matter for surprise that, under such circumstances, the delirious patient will make a desperate resistance to the attempts to restrain him. Not only his sensations, but his ideas, that it is but proper that he should be at home when ill, will urge him to the utmost resistance, and not often to resort to active measures in order to overcome an opposition which seems to him as unreasonable and unjust as it is uncalled for. The feeling prompting the patient is a very proper one; and he is conscious enough that what he feels to be right is upon his side. Consequently, his struggles only cease with exhaustion, and a wailing cry indicates that the consciousness of powerlessness is as painful as the bitterness of death. When that sound falls upon the ears of near relatives, it adds no little to the painfulness of their position, and heightens a scene already tragic! There is nothing wrong, improper, or perverse, about this persistence in the desire to escape from a strange place, and from those who so cruelly restrain a natural wish. Can it be any matter for surprise that, under such circumstances, a patient will evince a keen dislike as well as distrust of those whom, from his point of view, he has so little reason to love? Neither can it occasion surprise if the desire to leave his room and to get away is unwearying and persistent. The natural desire is sustained by a consciousness that there is nothing but what is proper and creditable in the wish to get away. The room is a hateful prison, and the attendants are heartless jailers, who restrain the sick man from getting away to his home, where he feels it but right that he should be.

In exactly the same way do erroneous impressions arise in a delirious patient's mind even when lying in a wonted chamber, if the aspect of that chamber be altered until the unsteady eye and wandering brain no longer recognise it on awaking. So familiar must all experienced practitioners be with this, that it

is somewhat surprising more allusion is not made in our textbooks to the necessity for keeping a fever patient in his own room, and also of retaining as far as possible the aspect of that room unchanged. A personal experience of delirium and its sensations, together with an experience of a near relative in delirium, compel me to write very distinctly about the desirableness of retaining the wonted associations of a sick-room, when To the painful experiences of the its inmate is delirious. craving to get home, experienced during delirium, are added the no less painful memories of watching a relative praying to be permitted to return home, and of feeling the powerlessness to accede to the request or to dispel the erroneous impression. After such experience, a strong wish exists to impress upon the minds of others the misery that may ensue from altering the arrangements to meet the necessities of a sick-room; to demonstrate what the drawbacks are to such changes; that in spite of the obvious advantages of the change it is undesirable. impression made upon the mind of the patient that he is imprisoned by hostile attendants is not only exquisitely painful, but it exercises an evil effect upon the progress of the case. feeling of suspicion and dislike is built up which interferes much with the general understanding which should always exist betwixt patients and their attendants.

It is obvious, then, that if opposition must be offered to a patient's wishes, it should be so conducted as to create no unnecessary impression of restraint, and that if the desires can be combated by cajolement, it is infinitely better than overt opposition. If the mental attitude of the delirious patient were but better understood, the attendants would be much encouraged to persevere in their attempts to restrain the patient by arguments, and appeals to what is left of reason; and their arguments would be all the more effective if they were directed to the erroneous impressions of the patient, and were calculated to correct the aberrations. If instead of holding the idea of wild, chaotic, objectiveless, mental wandering, the attendants but thoroughly realised the patient's objects and wishes, how tolerant they would become—how patient, in attempting to correct the patient's delusions and in restraining them if necessary. would substitute an intelligent tolerance for a feeling of simple pressure is movern healthine. Letter or presentation of the patient is entered to be patient to entered the patient is entered to be patient.

impared a reason of the restrict to the february of the latter lever, takes that Hillenbrane my Ventream nevered that stematos helle, e mais 15 mise he matemis mora seniareas and effections and to increase are increase and charic des of fracting ormer associations and different of affection or of ambition and it he age is titled at a attenue successful is other women to a comment to interest the entirement imprenone, for a little by commanding them as by arguing to believe the where homenia and other meas in the manus of the firewall mes, and a morney he reproduce it he consciousness by normal associations of deas. This is noted desirable in decirous Maries littled it some than among ratheres in a hospital, There mercin is simily decisioned in a sufficient staff to aneaul a green parient in such many vivint le impressionèle on second if he men. In the case if naments in home howers, nation we different and sien ham should always be aimed at Tiere a sometime very stangerme to the fell time patient in the somewhen that his hear relatives and friends those indeed apon vioni le previously thought le muli most rely, me trendry; to offer the most measurements resistance to those wishes which stress to limited well frumted and perfectly worse. There is no difficulty in seeing how very painful such impression must be to a mini wandering and yet conscious of the lately lead energy and hew desirable it is that such imprestion be arrived

Having said so much for the psychical treatment of delirium, the question of its physical treatment can be entertained. In order to make this lucid, it may be as well to eliminate two of the various forms of delirium from our inquiry by dismissing them briefly. As to the delirium which marks the onset of febrile conditions in children, it is a mere symptomatic affair, scarcely calling for treatment. Delirium tremens is a complex affair, and to be treated by the indications of each case. If the pulse be full, bounding, and incompressible, a good dose of opium with antimony is indicated in order to procure rest. But if the pulse be small, compressible, and very quick, when sleep is kept

off by that irritability which is so associated with commencing exhaustion in nerve structures, full doses of opium are dangerous. The sedative effect of opium upon the nerve centres under these circumstances is such that death has not rarely followed the administration of a medicinal dose of opium or morphia. It is possible that death here results from the effect of the opium upon the ganglia of the heart. Mr. Jones, of Jersey, gave tincture of digitalis in half-ounce doses for such delirium with good effect. Probably in such cases the combination of digitalis with bromide of potassium and some of the vegetable narcotics is indicated.

In the consideration of the delirium associated with sustained pyretic conditions from a therapeutic point of view, it is of the utmost importance to carefully weigh the different factors of the case, and to be guided accordingly. If there be considerable vascular excitement and heat of head, then opiates are inadmis-Chloral hydrate in fifteen-grain doses, repeated at hourly intervals till a drachm be given, is a much more suitable agent. as it exercises a very decided effect upon the vascular system as well as upon the nerve centres; or bromide of potassium may be exhibited with advantage. One point must be remembered, and it is this: in the typhoid state, when the tongue is covered with a dark fur of dead epithelium cells, a similar layer of effete cells lines the intestinal canal, and medicines given by the mouth are of little avail, because they are not absorbed. Subcutaneous injections of chloral hydrate of a strength of not more than ten grains to the ounce—in order not to cause severe local disturbance, as stronger solutions are prone to do-will often prove of decided service. The application of cold to the head by means of an indiarubber water pillow, and if necessary a bladderful of cold water placed on the top of the head, is a very useful measure. There is no doubt but that the temperature has much to do with the oncome of delirium, and the intelligence is rarely if ever unaffected when high temperatures are reached. Draughts of cold fluids are also serviceable. cold pack will restore the intelligence readily, even in severe delirium, when it lowers the temperature markedly; and the rise of the temperature to its previous height is accompanied by a return of the delirium. The lowering of the temperature

is an efficient means of affecting the abnormal action of the cerebral centres.

Such are the measures to be resorted to in delirium associated with high temperatures.

At other times a form of delirium is met with after the acute pyretic condition is over. It seems rather a form of cerebral exhaustion than a form of active delirium. Dr. Stokes enumerates three conditions which call for the use of opinm in fever: (1), where there is persistent watchfulness: (2), where an inflammatory condition of the brain has existed and been subdued, but delirium or other nervous symptoms still remain; (3), where an excited state of the sensorium exists without heat of scalp or remarkable throbbing of the arteries of the head. To these Copland adds the condition of there being free discharges or unrestrained evacuations.

The use of opium is clearly indicated in all these conditions except the first,—when it appears along with much vascular excitement. Here it would be much better to combine the opium with chloral, or to use chloral instead. At the time when Stokes wrote these directions, chloral was undreamt of, and so could not be alluded to.

Well advised and judicious therapeutic measures will greatly aid the moral treatment of delirium.

ON THE PHYSIOLOGY OF VOMITING AND THE ACTION OF ANTI-EMETICS AND EMETICS.

BY T. LAUDER BRUNTON, M.D.

THE act of vomiting consists in the forcible expulsion of the contents of the stomach through the esophagus and mouth. may seem almost unnecessary to mention the esophagus at all. for anything passing from the stomach to the mouth must needs do so through the esophageal tube. And yet this fact is not always borne in mind, and the active share which the cesophagus takes in producing emesis being forgotten, a false conception of the mechanism of vomiting is formed. For a long time opinions were divided regarding the part taken by the stomach in the expulsion of its contents. Some stated that this was chiefly effected by the active contractions of the gastric walls. Others affirmed that the stomach was entirely passive, and was merely emptied by the mechanical pressure exerted upon it by the simultaneous contraction of the diaphragms and abdominal muscles. It has now been shown that the first view is incorrect, and that the movements of the stomach cannot expel its contents 1 except in rare instances.2 Vomiting consists essentially in the simultaneous contraction of the abdominal muscles and diaphragm, which press on the stomach so as to squeeze out its contents. When these muscles are prevented from acting, either by cutting them across or by paralysing them with woorara, vomiting does not occur, although the stomach may be moving actively.

¹ Magendie, "Mémoire sur le vomissement," p. 23; Gianuzzi, "Centralblatt der med. Wissenschaften," 1865, p. 3.

³ Budge, "Die Lehre vom Erbrechen," p. 34.

On the other hand, vomiting may be produced by the contraction of the diaphragm and abdominal muscles, although the stomach remains perfectly quiet, and even when it is replaced by a simple bag. This was shown by the well-known experiment of Magendie.¹

This physiologist removed the stomach of a dog and attached a pig's bladder filled with fluid to the esophagus in its place. He then injected tartar emetic into the veins of the animal, and found that vomiting occurred in the same way as if the stomach had been in sitû. He noticed, too, that vomiting could be produced by the contraction of the diaphragm alone, after the whole of the abdominal muscles had been cut away, the linea alba only being left, and also, though imperfectly, by the contraction of the abdominal muscles alone, after the diaphragm had been rendered nearly motionless by section of the phrenic nerves. In ordinary vomiting, however, the diaphragm and the abdominal muscles co-operate together.

But it is quite evident that in vomiting there is something more than mere pressure of the stomach between the diaphragm and the abdominal muscles. In severe coughing the stomach is squeezed violently, but its contents are not usually expelled. The reason of this is, that in coughing the esophagus remains firmly contracted, and prevents anything escaping from the stomach. In the act of vomiting, on the contrary, the œsophagus relaxes, and allows the gastric contents to pass freely through it.4 In vomiting, therefore, there are two factors, viz. (1), pressure on the stomach; (2), a relaxed condition of the œsophagus, especially at its under end, just where it joins the stomach. This under end is sometimes called the cardiac sphincter of the stomach, although there does not appear to be any distinct band of fibres thicker than the rest at this point, as the name would imply.5

If either factor is wanting, vomiting will not take place. The relaxation of the sphincter is of no use if the muscles do

¹ Magendie, op. cit., p. 19.

² Magendie, op, cit., p. 23, and Budge, "Die Lehre vom Erbrechen," p. 43.

⁸ On. cit., n. 21.

⁴ Schiff, Moleschott's Untersuchungen, Bd. x. p. 378.

⁵ Gianuzzi, "Centralblatt der med. Wiss.," 1865, p. 3.

not contract, and they will exert themselves in vain if the cardiac sphincter remains contracted. This is seen in retching, which sometimes occurs without vomiting, even when the stomach is tolerably full.

The relaxation of the cardiac sphincter is effected by contraction of the longitudinal fibres which run along the under end of the esophagus below the diaphragm, and then radiate obliquely over the stomach. When these contract, they draw the cardiac end of the stomach nearer to the diaphragm, and at the same time dilate the cardiac orifice. When they are paralysed, vomiting becomes impossible. If their innervation is disturbed, so that they do not work in concert with the diaphragm and abdominal muscles, vomiting will occur only rarely, or not at all; for in such a case, when the abdominal muscles contract, the cardia will probably be closed; and when the cardiac orifice is open, the abdominal muscles will probably not contract. Thus, neither action is of any use, and it is only when, by some accident they happen together, that vomiting takes place.

It would be difficult for the muscles to exert any great pressure on the stomach if it were nearly or quite empty, but they will do so effectually if it be full. For this purpose it will not matter very much whether it is filled with food or air; and so it seems that both animals and men swallow air before vomiting. The emptier the stomach, the more air do they require in order to distend it, and the oftener do they swallow air. But it is impossible to swallow air alone; saliva must be swallowed at the same time. The ordinary secretion of saliva would probably be insufficient for this purpose, and we generally find that vomiting is preceded by such profuse salivation as will enable many swallowing movements to be made rapidly one after another.

When the stomach is very full, vomiting is somewhat difficult, for the organ then turns forward in such a way as to form a fold at the lower end of the œsophagus, and thus partially prevent the exit of its contents. Vomiting never occurs in the horse or rabbit, and rarely in guinea-pigs. This is probably due to the great length of that part of the œsophagus which lies

¹ Schiff, Moleschott's Untersuchungen, Bd. x., p. 380.

² Schiff, op. cit., p. 399.

between the diaphragm and stomach, so that the contraction of the longitudinal fibres causes it to fold and obstruct the cardiac orifice instead of opening it as in other animals.

The phenomena of vomiting may be thus described. easiness is felt; the inspirations become deeper; several swallowing movements are made which sometimes carry down sufficient air to distend the stomach moderately. After several deep inspirations there suddenly comes one which is deeper still. Then, instead of this being followed by expiration, the glottis shuts to prevent the escape of air, the diaphragm contracts still more, thus descending more deeply into the abdomen, and pulling the ribs together; the abdominal muscles forcibly contract; the left half of the stomach is drawn upwards. and the cul-de-sac flattened out; the cardiac orifice dilates, and the contents of the stomach are forcibly expelled. remains firmly contracted, and allows but little to escape into The closure of the pylorus has been ascribed by the intestines. Budge,² partly to mechanical compression by the liver, which is pushed down upon it by the diaphragm, and partly to contraction of its muscular fibres induced by the irritation of the pressure. It seems more probable, however, that the contraction of the pylorus is not due to any local cause, but is regulated, like that of the other muscles, by the nervous centre which presides over the act of vomiting.

This centre is situated in the medulla oblongata, and it is identical with or closely connected with the nervous centre which regulates respiration. It is connected with the abdominal muscles, the diaphragm, the stomach, and the œsophagus, by the intercostal, phrenic, and pneumogastric nerves respectively. Along these it sends the motor impulses which make the muscles contract and produce vomiting. For the sake of simplicity these nerves have not been represented in the diagram.

The nervous centre for vomiting is supposed to be closely connected or identical with the respiratory centre in the medulla oblongata. The reasons for this supposition are (1) that the movements of vomiting are excessively great and somewhat modi-

¹ Schiff, op. cit., p. 362.

³ Budge, "Die Lehre vom Erbrechen," p. 49.

fied respiratory movements, and (2) that emetics excite the respiratory centre, while depression of the respiratory activity stops Usually it is easy, by vigorous artificial respiration, to saturate an animal's blood with oxygen, and then, having no longer any need of fresh air, it ceases to breathe for a while: and any person after taking a few deep breaths will find that he can hold his breath a much longer time than before. condition in which no respiration is needed, and consequently no movements of breathing are made by the animal, is termed apnæa by the Germans, while we use the same term to signify an aggravated condition of dyspnæa. I use the term in its If emetics are injected into the veins, the German sense. respirations become more frequent; and it is stated by Hermann and Grimm that no apnœa can be produced by the most vigorous artificial respiration. And on the other hand, the artificial respiration prevents the occurrence of vomiting so long as it is continued.1 This seems to indicate that the respiratory centres are closely connected, and it is by no means improbable that some of the nerve cells and fibres which compose the respiratory centre in the medulla oblongata also form part of the centre for vomiting. Yet the movements of respiration and vomiting, although somewhat alike, differ very considerably from each other; and we are, I think, justified in supposing that the centres for respiration and vomiting are not absolutely identical,2 although a part of each may possibly be common to both. Moreover, the centre for vomiting may be completely paralysed by narcotics, such as opium, chloral, or chloroform, while the respiratory movements continue or may even be increased.3 I have also found that in chloral narcosis it is easy to produce apnœa after tartar emetic has been injected into the blood and sulphate of zinc into the stomach. This could hardly be the case if the centres for respiration and vomiting were identical. I shall therefore speak of them as distinct.

The nervous centre for vomiting is usually excited to action reflexly by irritation of certain afferent nerves. They may be divided into two classes: (a) those which pass upwards from

¹ Grimm, Pflüger's Archiv, iv. p. 205.

² Harnack, Arch. f. exp. Path. u. Pharmakol, ii., p. 285.

³ Ibid, p. 90.

the body to the medulla, and (b) those which pass downwards to it from the brain. It is easy enough to allot a few nerves to one or the other of these classes, but there are many others which we cannot with certainty place in either division. Thus, the pharyngeal branches of the glosso-pharyngeal nerve pass upwards to the medulla and act upon it independently of the brain, for tickling the fauces will produce vomiting in a man whose cerebral faculties are so besotted with alcohol that he hardly feels blows or bruises which would cause him severe pain when sober. On the other hand, the nerves of taste and smell only act on the vomiting centre through the brain, for persons in the mesmeric sleep will drink the most nauseous mixtures with a smiling face, while the very remembrance of disgusting tastes, sights, and odours would make them sick in their ordinary waking condition. But we cannot so readily say how the vomiting centre is excited by those nerves which convey painful impressions from various parts of the body. Severe pain will often cause nausea and vomiting, although the pain may originate in the most various parts of the body. Thus, & person suffering from a loose cartilage in the knee-joint tells me that the pain it occasions always brings on nausea and vomiting. A painful wound may produce a similar effect, and Helmont 1 relates that after dislocating a joint, nausea and vomiting came on, and lasted until the bones were replaced. A blow on the testicles, an inflamed ovary, and the passage of a calculus along the gall-duct and ureter, all cause pain and often vomiting. Some say that the vomiting is due to the pain, and that it only lasts while the pain continues, the pressure of the calculus and the irritation it thereby causes having nothing to do with it. It may be the case, then, that the irritation of the nerves of a limb in the case of a loose cartilage or a dislocation, of the hepatic and renal nerves in the case of a calculus, and of the intestinal, ovarian, and other nerves, all act through the sensory portions of the brain; but it is not yet certain that they do so, and it is so much more convenient to represent them as going direct to the medulla, than as going round to it vid the cerebrum, that I have given them a direct course in the accompanying diagram. In it I

¹ Quoted by Budge, op. cit., p. 15.

have represented the following as the afferent nerves which pass up directly from the body to the medulla oblongata, and excite to action the vomiting centre situated there:—Pharyngeal branches of the glosso-pharyngeal; pulmonary branches of the vagus; gastric branches of the

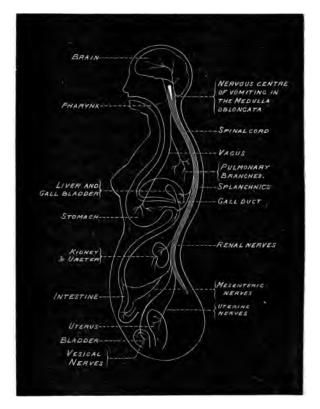


Fig. 1.—Diagram showing the afferent nerves by which the vomiting centre may be excited to action.

splanchnic; hepatic branches of the splanchnics (of the vagus?) renal nerves; mesenteric nerves; uterine nerves; ovarian nerves; vesical nerves.

Those fibres which are represented as passing down from the brain may indicate the path by which the vomiting centre is excited, by impressions of sight, taste, smell; by simple recollections or imaginations; by blows on the head, or inflammation of the brain or its membranes.

After this general description, we will proceed to examine these nerves more particularly.

They are—1. The branches of the glosso-pharyngeal nerve. distributed to the soft palate, root of the tongue, and pharynx.1 Tickling these parts with the finger or with a feather is one of the readiest methods of inducing vomiting; and sometimes, as in cases of poisoning by mushrooms, the stomach can be emptied more readily by it than even by tartar emetic. When they are inflamed, they not unfrequently give rise to a cough, which is distinguished by violent expulsive efforts, nearly resembling retching, and not unfrequently accompanied by true retching, or even vomiting. This is often seen in children. One may frequently hear parents chide their children for coughing so noisily, and say to them, "Don't cough so loud," "Restrain your cough." Whenever these expressions are used, one may be almost certain that the chief cause of the cough is inflammation of the fauces, although this may sometimes be accompanied by bronchitis. 2. The gastric branches of the vagus and splanchnic nerves. It has been found by Blondlot and Bernard that when the mucous membrane of the stomach is gently tickled it becomes very rosy, and secretes gastric juice freely. mechanical irritation is carried further, so as to produce pain, the rosiness disappears and the surface becomes pale; the secretion of gastric juice is arrested; ropy mucus is poured out instead; and the movements of the stomach are much increased. At the same time the animal shows signs of uneasiness and nausea, and if the irritation is continued vomiting occurs, and bile has been observed to flow into the stomach.2 Similar phenomena are produced by various kinds of food and medicine. Thus, the introduction of food into the stomach usually causes secretion of gastric juice; but when it is hard and indigestible, or irritating, it may arrest digestion and cause vomiting. Dilute bitter infusions give appetite, and seem to aid digestion; but & strong infusion of quassia will act as an emetic. As the vagi

¹ Budge, "Die Lehre vom Erbrechen," p. 131.

² Quoted in Carpenter's "Physiology," 7th edition, p. 128.

are the sensory nerves of the stomach,1 and several of these phenomena can be produced by irritating their trunks,2 it is probable that they have a good deal to do with the conduction of impressions from the stomach to the vomiting centre. they are not the only afferent nerves from the stomach; for irritation of this organ will produce vomiting after they have been cut.³ In this case it is probably through the splanchnic nerves that the irritation is conveyed to the medulla. 3. The branches of the vagi and splanchnics going to the liver and gall-Vomiting is of frequent occurrence in hepatitis, and during the passage of a calculus through the gall-duct.4 It is probably due to irritation of these nerves; although, as we have already said, it is difficult to decide whether the nerves act directly on the medulla or only indirectly through the brain. 4. The pulmonary branches of the vagus. Irritation of these branches is not a very common cause of vomiting, and it may be doubted whether they cause vomiting directly or only indirectly. It is possible that the vomiting in the early stages of phthisis may be due to these nerves, and it may be well to bear them in mind, and to examine the lungs in cases of vomiting without any obvious cause. 5. The renal nerves. Vomiting occurs in nephritis and when calculi are irritating the pelvis of the kidney or passing down the ureter. 6. The mesenteric Vomiting is almost always present in cases of strangunerves. lated hernia or intussusception. It also occurs in animals after a ligature has been tied firmly round a piece of the small intestine. It may be arrested by dividing the mesenteric nerves passing from the ligatured point.6 Its occurrence in general peritonitis is probably due likewise to irritation of the mesenteric nerves. 7. The vesical nerves. It is somewhat doubtful whether the vomiting sometimes observed in cystitis is due to irritation of these nerves or to irritation of other nerves by the extension of the inflammation from the bladder to the

¹ Budge, "Die Lehre vom Erbrechen," p. 127.

² Rutherford, Trans. Roy. Soc. Edin., 18.

³ Budge, op. cit., p. 94.

⁴ Watson, "Practice of Physic," 4th edition, pp. 586, 606.

⁵ Craigie, "Practice of Physic," vol. ii., p. 996; Watson, op. cit., vol. ii.

⁶ Schiff, Moleschott's Untersuchungen, Bd. x. p. 390.

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adjoining parts. 1 S. Uterine nerves. Irritation of these nerves is one of the commonest causes of reflex vomiting. It may be produced either by the presence of the feetus in the uterine cavity, by inflammation of the womb itself, or by electrical irritation of the uterine plexus.² 9. Ovarian nerves. Vomiting is a symptom of inflammation of the ovaries.³ 10. Irritation of various parts of the brain. Vomiting may be produced by mental states excited by a disagreeable taste, by the sight or smell of disgusting objects, or even by the mere recollection of these; by emotions, such as anger, suspense, grief, joy, &c.: continued and intense thought, &c.: by concussion: by the irritation consequent on loss of blood, or caused by the withdrawal of blood from the general circulation and its accumulation in the abdomen in cases of shock.5 Vomiting is one of the most marked symptoms in meningitis and cerebritis, and is noticed also in some cases of tumours of the brain. Budge states that the cerebral centre for the movements of the stomach is the right corpus striatum and optic thalamus, especially the latter.6 Irritation of these parts causes the stomach to move, while irritation of the corresponding parts on the left side of the brain have no action on the stomach whatever. From this observation we are led to suspect that when any irritation exists in the right hemisphere it will occasion vomiting more readily than irritation in the left hemisphere; and, according to Budge, this is actually the case.

There are thus many conditions of the brain which induce vomiting, and if we knew a little more about them we might separate them as we have done the nerves of the stomach, uterus, &c., instead of representing them all together, as we have done in the diagram. But even if we count them as one, we have altogether no less than ten nerves indicated in the diagram as exciting the vomiting centre reflexly. I shall not attempt to enter here on the means of diagnosing between the vomiting arising from irritation of all these nerves, but shall enter at once on the treatment.

¹ Craigie, "Practice of Physic," vol. i. p. 930.

² Pflüger's Archiv, Bd. viii. p. 851.

³ Hooper's "Physician's Vade Mecum: Oöphoritis."

⁴ Budge, op. cit., p. 153.

⁵ Practitioner, vol. xi. p. 250.
⁶ Budge, op. cit., p. 116.

As vomiting is generally a reflex act consequent on the irritation of some nerve, its rational treatment is either to remove the irritant; or, if this is impossible, to lessen the irritability of the nervous centre in the medulla, so that it no longer responds to the irritation. Not unfrequently we combine both methods. In inflammation of the fauces we use soothing or astringent gargles, confections, or glycerines. When the stomach is irritated by indigestible food or acrid matters present in its cavity, a large draught of warm water and mustard will often cause their ejection, and thus forms one of the best means for arresting further vomiting. If the irritant consists in an inflamed condition of the mucous membrane of the stomach itself, such treatment would be of little service, and we must endeavour to lessen the inflammation and to render the sensory nerves of the stomach less irritable. This we do by the use of bismuth and of hydrocyanic acid. It is well known that if one holds the finger over the mouth of a bottle of hydrocyanic acid for a few minutes it becomes numb and loses its sensibility; and we have every reason to suppose that the acid acts in the same way on the nerves in the wall of the stomach, so that the inflammatory condition present there no longer irritates them to the same At the same time, however, we may give some drug to lessen the irritability of the vomiting centre in the medulla, such as morphia or chloral. Bromide of potassium has a considerable power to lessen most reflex actions, that of vomiting among the rest, and my friend Dr. Ferrier has used it with great success in sea-sickness. Acting on his suggestion, I have found the following formula very useful in gastric catarrh and subacute gastritis:-

R. Bismuthi subnit, gr. x.
Potass. bromid., gr. xv.—xx.
Acid hydrocyan. dil., \(\mathbb{v}\) v.
Spt. chloroform, \(\mathbb{M}\) x.
Mucilag. tragacanth, fl. 3ij.
Aqua, ad. fl. \(\frac{3}{2} \) j.

Sg. To be taken every three or four hours.

The medicine should be given about ten minutes before food, so as to diminish the irritability of the stomach and prevent the

rejection of the nourishment, and it is often advisable to make the patient lie down on the left side either during or immediately after the meal. A tendency to vomit is often increased by lying on the right side. This is attributed by Budge¹ to the greater pressure exerted by the liver upon the stomach in this position, and this may be correct. It seems to me probable, however, that the mere weight of the stomach itself and of its contents will exert a drag upon it, directed more or less towards its pyloric end, either in the sitting posture or when recumbent on the right side. Now, the stomach is much more sensitive to any pull exerted in this direction than to one towards the cardia. even in the normal condition, and it is likely to be still more so when rendered hyperæsthetic by inflammation. I am therefore inclined to ascribe the benefit derived from lying on the left side to the absence in this position of any drag on the stomach and the irritation it would cause, rather than to any change in the relations of the liver.

I have already mentioned that it is doubtful whether irritation of the pulmonary branches of the vagus induces vomiting directly in the same way as irritation of the gastric branches does; but vomiting, occasionally of a very obstinate kind, is certainly found in phthisis, and it may be due to this cause. When it seems to be caused by the cough, it is sometimes checked by doses of six to ten grains of alum. This is rather hard to explain on the supposition that the vomiting is here due to the irritation of the pulmonary nerves, for the alum can have but little sedative action either on the lungs themselves or on the medulla. If we look at a patient coughing and mark the swollen veins on the forehead and neck, and remember that these are merely the visible signs of the general congestion throughout the whole venous system, including the veins of the stomach, we can hardly help thinking that the constant distension of the gastric veins during the almost incessant paroxysms must either in itself act as an irritant and thus induce vomiting, or lead to such a condition of the mucous membrane as will do so. If this be so, the action of alum as a local astringent in removing congestion may well explain its beneficial effect in arresting vomiting.

The same principles prevail in the treatment of vomiting due

¹ Budge, op. cit., p. 66.

to irritation of the other abdominal nerves as of those of the stomach; but in them we can less easily soothe the local irritation by local means, and we are obliged to depend still more on remedies which will act on the medulla. But we by no means neglect to remove the irritant as far as possible. In hepatitis we strive to subdue the inflammation by blisters and depletion; in intussusception we try to restore the bowel to its normal condition by copious injections of water or oil; in strangulated hernia we relieve the incarcerated bowel by an operation; and in inflammation of the uterus, ovaries, and bladder, we have recourse to depletion, blisters, and other appropriate local remedies. Even in pregnancy, if other means fail, we are sometimes obliged finally to remove the irritant by inducing premature labour, and sacrifice the offspring in order to save the life of the mother.

But in such cases we base our hopes of arresting vomiting rather on our ability to diminish the excitability of the vomiting centre by means of opium, bromide of potassium, chloral, or hydrocyanic acid, than our power to remove the irritant.

In sea-sickness it is difficult to say what the irritant is which excites the vomiting centre to action. For my own part, I am inclined to believe that it is the shaking and dragging of the abdominal viscera caused by the motion of the ship. Subjective sensations point unmistakably to this as the cause, and the testimony they afford is strengthened by the fact that the sickness becomes less troublesome if the movements of the abdominal viscera are restrained by a tight bandage applied externally, or even by distension of the stomach with food. Whatever be the cause, however, the treatment is chiefly directed to the vomiting centre, and my friend Dr. Ferrier has found bromide of potassium in large doses of especial service in preventing as well as arresting the distressing nausea and vomiting which make many persons regard a trip across the Channel with perfect horror.

Thus far we have directed our attention to the act of vomiting, chiefly with the view of arresting it. Sometimes, however, we wish to induce it, and for this purpose we employ various substances which are generally all classed together as emetics. They naturally divide themselves into two subdivisions. Those

belonging to the one act, like mustard, only when introduced into the stomach; those belonging to the other act like tartar emetic, both when introduced into the stomach and when injected into the veins. The first class includes, besides mustard, the sulphates of zinc and copper, as well as other irritant substances not usually employed as emetics: they induce vomiting reflexly by irritating the nerves in the stomach; and as the effect they produce is the same as that of scratching the mucous membrane, they are sometimes called mechanical emetics. The second class includes tartar emetic, ipecacuanha and its active principle emetia, apomorphia, veratria, delphinia, cyclamin, asclepiadin, and sanguinarin: they also cause vomiting when injected into the veins, but they are not used medicinally as emetics.

It used to be considered certain that emetics of this class produce vomiting by acting directly on the nervous centre in the medulla oblongata, to which they were conveyed by the blood, and not by exciting it reflexly by irritating the stomach, like the mechanical emetics. This view seems to be to a certain extent correct, and the vomiting which follows the injection of such a substance as tartar emetic into the veins is probably partly due to its direct action on the vomiting centre, but partly also to its reflex action on this centre through irritation of the stomach. For, as Buchheim has pointed out, when emetics are injected into the blood, they are carried by it to the stomach as well as to the nerve centres, and thus they may irritate it and induce vomiting in exactly the same way as if they had been passed into it through the œsophagus. Tartar emetic, for example, will cause vomiting, either when injected into the veins or when swallowed, but in both cases it reaches the mucous membrane of the stomach and irritates it. It is true that when injected into a vein it reaches the vomiting centre also, but when swallowed it is sometimes rejected almost entirely, so that little or none reaches the vomiting centre. In both cases, then, the emetic acts on the stomach, but only in one does it act on the medulla. Yet vomiting occurs in the one case as well as in the other, and it is therefore only natural to attribute it to the action on the stomach, and not to its

¹ Buchheim, "Arzneimittellehre," 1853-56, p. 304.

action on the medulla. Besides, tartar emetic only precipitates albumen when in presence of an acid; the gastric juice in the stomach therefore causes it to precipitate the albumen in the mucous membrane. This produces irritation and inflammation in it, when no change whatever can be detected, either by the naked eye or the microscope, in other organs, such as the medulla. It may thus be fairly said that until we do find a change in the medulla, we ought to ascribe the vomiting only to the action of the emetic on the stomach.

But having said thus much on the one side of the question, let us turn to the other and see what arguments may be adduced in proof of the action on the medulla being the true cause of vomiting. First of all comes the somewhat staggering fact, that after Magendie had removed the stomach of a dog altogether and replaced it by a bladder, the animal vomited when tartar emetic was injected into the veins. If the drug only caused vomiting by irritating the stomach, how can it do so after the stomach is removed? Hermann,2 who supports the gastric action of tartar emetic, tries to get over this difficulty by supposing that it irritates the mucous membrane of the esophagus and pharynx, and that the vomiting in Magendie's experiments was induced by its action on these parts. This explanation may be correct, but these parts, instead of being acid, like the stomach, are alkaline, like the medulla, and there is therefore no reason why the tartar emetic should act on them rather than the nervous centre. This experiment of Magendie's in itself affords great support to the old doctrine of the central action of tartar emetic, and recent experiments on the action of apomorphia render it strongly probable that apomorphia, another emetic of the same group, likewise acts on the medulla directly. Apomorphia, although of recent introduction, having been discovered by Mathiesson in April 1869, and first investigated by Gee a month afterwards, bids fair to supplant other emetics, as it is so rapid and certain in action, and can be applied either subcutaneously or administered by the mouth with equal ease. Gee noticed that small doses of $\frac{1}{5}$ of a grain caused vomiting in dogs, and large ones occasioned in ad-

¹ Ipecacuanha does so also. Gubler, Comment. Thérap. 1868, p. 627; and D'Ornellas, Bull. de Thérap., tome lxxxiv, p. 199.

² Hermann, Pflüger's Arch. v. p. 280.

dition a curious manége movement, the animals running round in a circle ¹ in somewhat the same way that Longet noticed them to do after a wound of the optic thalamus.²

This effect of apomorphia points to an action of the drug in the nervous centres, and is all the more interesting when we remember that Budge placed the cerebral centre for the stomach in the right thalamus.

Gee's experiments were repeated and extended by Siebert³ who noticed that apomorphia produced great acceleration of the respiration, pointing distinctly to excitement of the respiratory centre, which is closely connected with the centre for vomiting. Now, the respiratory centre, like the vomiting centre, may be excited reflexly by irritation of the vagi; but Harnack,4 in a recent research, has found that the excitation caused by apomorphia is not reflex, but is due to the direct action of the drug on the respiratory centre itself. As this centre and that for vomiting are so closely connected, it seems a fair inference that the apomorphia acts directly on the vomiting centre also, and produces emesis by irritating it. As both tartar emetic and ipecacuanha excite the respiratory centre also, it is probable that like apomorphia they act directly on the medulla, and thus we are led back to the old notion of the central action of this group of emetics. But as these are such weighty arguments in favour of their reflex action, we can hardly help coming to the conclusion that they may act either centrally or reflexly, and in all probability usually combine the two actions whenever they are introduced into the blood. When apomorphia is injected subcutaneously or into a vein, a smaller dose is sufficient to produce vomiting than when it is introduced into the stomach, while a larger dose of tartar emetic must be injected than would be sufficient if administered by the mouth. seems to show that the emetic effect of apomorphia is due chiefly to its action on the medulla, and less to its action on the stomach, while tartar emetic acts less on the medulla and

¹ Gee, "Clinical Society's Transactions," vol. ii. p. 168.

² Longet, "Traité de Physiologie."

Siebert, Untersuch über d. physiol. Wirkungen des Apomorphins. Inaug. Diss. Dorpat, 1871, p. 60.

⁴ Harnack, Arch. f. exp. Pathol. u. Pharmakol. Bd. ii. p. 283.

⁵ Greve, Berlin. Klin. Wochensch. 1874, p. 351.

more on the stomach. It has been already mentioned that tartar emetic only acts as a powerful irritant when if comes in contact with an acid, especially hydrochloric acid, as it does in the healthy stomach. Consequently, its irritant action on the stomach will be much less if the hydrochloric acid usually present in the organ should be diminished or absent. Now, it has been found by Manasseïn¹ that the proportion of acid in gastric juice is diminished, or the acid altered, during the febrile condition; and clinical experience long ago showed that tartarated antimony did not exert its usual emetic action in persons suffering from pneumonia, or, as physicians were accustomed to express it, there was a tolerance of the drug.

The employment of emetics is not nearly so extensive now as it formerly was. They may be administered (1), for the simple purpose of evacuating the contents of the stomach and duodenum; (2), for the effect of the muscular movements during vomiting upon other organs; (3), for their effect on the nervous system.

In cases of poisoning, the first thing to be done is to remove the poison from the stomach, and thus prevent it either from injuring the gastric walls themselves or from being absorbed into the blood. We usually employ sulphate of zinc or copper as an emetic for this purpose.

In indigestion, the case of the patient is often really one of slight poisoning, although we are rarely accustomed to regard it as such. Not only do the undigested articles of food act as mechanical irritants to the stomach, but they undergo fermentation, and the products of this are real poisons. Butyric acid, for example, is frequently produced by the fermentation of food in the stomach, and, as Otto Weber has shown, it is a powerful The same is the case with the sulphuretted hydrogen, which gives the disagreeable odour of rotten eggs to the eructations of some patients. The irritating matters in the stomach not unfrequently cause nausea and headache, without leading to vomiting; but if they should be ejected, nausea generally ceases. Therefore, the best treatment frequently is to give copious draughts of warm water, or warm water and mustard. use warm or tepid water because cold lessens the irritability of the stomach, and thus prevents emesis altogether; and we add

¹ Manasseïn, Virchow's Archiv, 1872, lv. p. 413.

the mustard in order to stimulate the gastric walls. But it is not those matters only which have been introduced into the stomach which are evacuated by vomiting. A quantity of the gastric secretions is also ejected, and anything they may happen to contain is thus removed from the body.

In a former paper 1 I explained that certain substances, when swallowed, were absorbed by one part of the intestinal canal excreted by another, and again re-absorbed, so that they may



Fig 2.—Diagram showing the circulation of substances in the organism, caused by their absorption, excretion, and re-absorption.

sojourn a long time in the body before being finally eliminated Thus iodide of potassium is absorbed by the stomach, excreted by the salivary glands, and re-absorbed by the stomach, so that it goes round and round in the gastro-salivary circulation. Most metals, lead probably among the rest, are excreted in the bile and absorbed by the small intestine, so that they go round in the entero-hepatic circulation. Purgatives, by hurrying the

¹ Practitioner, vol. xii. p. 408.

secretions through the intestinal tube, prevent re-absorption to some extent, and thus aid in the expulsion of the metals or other substances they contain. But it is much further from the duodenum to the anus than from the duodenum to the mouth: and anything taking the longer route is much more likely to be absorbed than if it took the shorter way. In violent vomiting, bile is evacuated by the mouth without getting a chance of re-absorption; and a course of emetics, therefore, seems far better suited to remove bile and anything contained in it—such as lead or copper—than a course of purgatives can be. It is not improbable that it is so; and a mixed course of emetics and purgatives is really exceedingly useful in lead-poisoning; 1 but the discomfort which attends vomiting causes a very decided preference to be given to purgatives. Nor are metals the only substances which circulate in this way; bile itself does so, and its removal by vomiting gives relief in biliousness. also thinks that malarial poison, whatever that may be, circulates with the bile in the portal system; and it is exceedingly interesting to learn that the natives of Morocco, as my friend Dr. Duckworth informs me, having no quinine, actually treat intermittent fevers by emetics. It is stated also by eminent physicians that an emetic at the beginning of a continued fever, such as typhus, is of great service; and it is possible that it acts there in the same way as we suppose it to do in intermittent fevers, viz., by removing the fever poison.

The violent expulsive efforts in vomiting do not act only on the stomach; they affect also the lungs and expel anything in the air-passages still more effectually than can be done by coughing. Emetics are therefore used in croup and bronchitis. The gall-bladder is also much compressed by the descending diaphragm, and the bile is forced through the common bile-duct, instead of trickling through it with almost no pressure at all, as it usually does. Any obstruction in the duct which the ordinary pressure of the bile would never move, will then be pressed on into the duodenum, unless it be too firmly impacted. Gall-stones in the duct, and jaundice depending on the obstruction they occasion, can thus be removed by the action of emetics; but

¹ Dictionnaire des Sciences Médicales, 1815, tome ii. p. 522.

² Lussana, Lo Sperimentale, tome xxix. 1872, p. 358.

there is always the danger that, if the obstruction is at all firm, the violent efforts may burst the gall-bladder and lead to the death of the patient.

Finally, emetics may be used to produce an "impression on the nervous system,"—a vague term which may mean anything or nothing, and may be explained by everyone as best he pleases. The facts are, that in cases of epilepsy, where the fits tend to recur every few minutes and the unconsciousness may last for hours, an emetic may sometimes put an end to the attack. An impending ague fit may sometimes be arrested by an emetic given just before it is expected to begin.¹ It may be also useful in hysterical fits; but these are so readily arrested by a galvanic shock, that few would think of using anything else while a battery is at hand.

It seems probable that the nervous excitement which causes the epileptic or other fit, discharges itself in the exertion of vomiting, but it would take too long to enter on this subject here.²

To sum up, the chief points in relation to vomiting and the action of drugs upon it are:—

- 1. Vomiting consists in two factors, viz. (1) the simultaneous compression of the stomach by the abdominal muscles and diaphragm, and (2) the opening of the cardiac orifice by the contraction of the longitudinal fibres of the esophagus.
- 2. When innervation is disturbed, these two factors do not occur together, and thus retching may occur without vomiting.
- 3. The movements of vomiting are correlated by a nervous centre in the medulla oblongata, from which impulses are sent down through various motor nerves to the muscular structures engaged in the act.
- 4. This nervous centre is probably closely connected with the respiratory centre, but is not identical with it.
- 5. It is usually set in action reflexly by irritation of the pharyngeal, gastric, hepatic, enteric, renal, uterine, ovarian, and possibly also by the pulmonary and vesical nerves which come from the periphery towards it. It may also be excited by impressions sent down to it from the brain.
 - 6. Voniting may be arrested in two ways, either by removing

¹ Materia Medica, &c., by H. C. Wood, p. 362.

² See Lauder Brunton on "Inhibition," West Riding Asylum Reports, 1874.

the irritant which is exciting the vomiting centre, or by lessening the excitability itself, so that the centre no longer responds to the impressions made on it from without.

- 7. Emetics may be divided into two classes: those which act only on the stomach, and those which act on the vomiting centre also.
- 8. Tartar emetic probably acts in both ways. Tolerance of it is probably due to want of hydrochloric acid in the stomach.
- 9. Emetics may be used to evacuate the stomach and duodenum. They thus remove irritating matters, poisons generated in the stomach by putrefaction, bile, and metals or fever poisons circulating in the entero-hepatic circulation.
- 10. They may be also used to empty the bronchi and gall-bladder, or to cut short epileptic and to prevent ague fits.

Seviews.

Leport on the Action of Mercury, Podophyllin, and Taraxacum on the Bulary Secretion. By J. Hughes Bennett, M.D., F.R.S.E., Chairman and Reporter. 2nd Ed., with Appendix; Sva pp. St. Elinburgh: Edmonston and Douglas.

This is a regain; of the original report of the committee, with the addition of some remarks by Dr. Bennett. The report itself contains a record of most valuable experiments, chiefly made by Drs. Entherford and Gamgee. These show that calomel and other mercurials, podophyllin and taraxacum, do not increase the secretion of bile in an animal having a biliary fistula. From the care with which these experiments were made, there can be little doubt of their correctness; but the opinions which Dr. Bennett founds on them, and supports with his usual force and vigour in the Appendix, are quite erroneous. He completely disregards the results of clinical experience, and condemns the use of mercury as a cholagogue because it does not increase the amount of bile poured out by the liver. He totally forgets the fact that what we want in cases of biliousness is not increased secretion by the liver, but removal of bile from the blood. As was pointed out in the June number of this journal, this result may be attained by the mercurials removing the bile from the intestine and preventing its reabsorption, quite as readily as by stimulating the liver to increased action.

On the Functional Derangements of the Liver: being the Croonian Lectures for 1874. By CHARLES MURCHISON, M.D., F.R.S., &c. Smith, Elder, and Co.

THESE lectures are the natural outcome of the present state of physiology. The Galenical doctrines concerning the liver were discredited in the schools of physiology after the discovery of the thoracic duct by Pecquet and the circulation by Harvey. Yet they held their ground amongst the physicians, and it was only within the last fifty years or thereabouts that opinion began

to set steadily against the liver. Its only function was thought to be that of the secretion of bile, and Sir Thomas Watson expressed the current medical belief when, in speaking of the liver, he said: "It is not so frequently in fault as many would have us believe; it is often blamed most gratuitously and unjustly." But now the Galenical theories have been revived in the hands of Bernard and Meissner. Bartholinus is proved to be premature in writing his epitaph; and the prophetic soul of Johannes de Turre fully avenged. So it is not surprising to find that medicine is following in the steps of physiology. The liver does more than simply secrete bile. The physician therefore begins to inquire what may be the disorders of the newly-discovered functions.

We cannot do more than recommend these lectures to all readers engaged in the active practice of medicine. They are an exhaustive account of all that is known or suspected on the subject. We welcome the book because it does not pretend to certainty of knowledge, but is rather suggestive of further observation and experiment. Dr. Murchison must have had this passage from Cicero in his mind while writing these lectures: "Ut potero explicabo; nec tamen, ut Pythius Apollo, certa ut sint et fixa quæ dixero; sed ut homunculus, probabilia conjectura sequens."

The lectures are divided into three heads: (1) the glycogenic function of the liver and its derangements are discussed; (2) a function closely allied to the glycogenic function, viz., that of the power of the liver to split up albuminous compounds into glycogen and nitrogenous matter; the nitrogenous matter being regarded by Dr. Murchison as either urea or closely allied to urea; and (3) the secretion of bile. The volume ends with very pertinent remarks upon treatment,

Lessons in Laryngoscopy, including Rhinoscopy and the Diagnosis and Treatment of Diseases of the Throat. By Prosser James, M.D., M.R.C.P., Lecturer on Materia Medica and Therapeutics at the London Hospital, Physician to the Hospital for Diseases of the Throat, &c. London: Baillière, Tindall, and Cox.

This small volume, coming from the pen of a physician who has been in the habit of practising and teaching the art of laryngoscopy since the year 1860, may be expected to contain much that is new and of interest to all practitioners of medicine. The careful reader of the book will not be disappointed.

The instructions as to the method of introducing the laryngeal mirror into the throat are good and concise, pointing out the commonest errors of beginners in the laryngoscopic art. 432 REVIEWS.

Unusual appearances, produced by the uvula, and also, at times, by certain conditions of the epiglottis in health, receive a few words of notice that are worth much to one commencing

the study of laryngoscopy.

The description given of the different parts, as they come into view in the laryngeal mirror, is written with great care and evidently from frequent and patient observation. The colour of the different portions of the larynx is noted, so that the reader may not mistake the natural hue of the laryngeal surface of the epiglottis for congestion, and proceed assiduously to treat a healthy mucous membrane with astringent applications till an artificial disease is created and the laryngoscope undeservedly thrown into much discredit.

When speaking of change of colour in actual disease of the larynx, Dr. James does not fail to draw attention to that anæmic condition of the larynx which, in our own experience, is so very significant of commencing pulmonary consumption. The enlargement of the cornicula laryngis, as a sign of consumption, is also mentioned. The enlargement of the cornicula in early phthisis was first pointed out several years ago by Dr. Morell Mackenzie, and we believe that increasing experience with the laryngoscope tends to prove its value as a

diagnostic sign.

Speaking of laryngeal therapeutics, Dr. James describes various instruments in use for injecting solutions into the laryngeal cavity: many of these are elegant and ingenious; but Dr. James certainly speaks from sound practical experience when he says that injections are much more distressing to the patient than is the contact of the laryngeal brush, now so much used at the Throat Hospital. In employing glycerine, Dr. James recommends that this fluid be mixed with water, as pure glycerine is not the bland unirritating fluid that some consider it to be. The remarks on the use of gargles and the nasal and pharyngeal douche are excellent and thoroughly practical.

The last pages of the work treat of topical medication of the larynx by sprays and steam inhalations, and here we are rather disappointed at not getting rather more detail and precision in respect to the sort of cases suited by the various kinds of inhalation. The experience of the Throat Hospital on the effects of various inhalations we believe to be extensive, and the teaching of one of the physicians would be appreciated by

most practitioners.

The chapter treating of growths in the larynx and their removal by instruments is well worth perusal. Czermak, it seems, was the first to discern a polypus in the larynx in 1859, in the case of a patient who had long suffered from hoarseness. Dr. T. Walker, of Peterborough, was the first person in England

to remove a laryngeal growth by operation in 1861. A large variety of laryngeal instruments have since that date been contrived by Dr. James, Dr. Mackenzie, and others, and many cases of obstinate hoarseness and loss of voice have been radically cured by the operation of removing small growths from the larnyx.

Diagrams are given by Dr. James of the instruments in most common use, and their respective merits are fairly and im-

partially discussed.

Among the coloured plates at the end of the volume especial praise is due to the excellent plate of the rhinoscopic image in health; the two plates will make the reader familiar with a part of the body with the look of which he may not hitherto have been much acquainted.

Notes of Demonstrations on Physiological Chemistry. By S. W. Moore, F.C.S., Joint Demonstrator of Practical Physiology at St. George's Hospital. London: Smith, Elder, and Co.

This book is intended by the author to supply the average medical student with "hints as to which are the most important points in practical work which he can be expected to acquire," and to show him the "methods that more nearly concern his immediate and future requirements." It is too short to be of much use in the laboratory, but it may prove serviceable in refreshing the student's memory after he has seen the processes There are a few mistakes, which we point to which it alludes. out for correction in the next edition. At page 7 we find the statement that acid albumin "is not precipitated by magnesium sulphate or calcium chloride except on boiling, which process converts it into alkali albumin." Here the author has omitted to mention that excess of alkali should be added to the solution of acid albumin before boiling, as otherwise the process of ebullition would not alter it. At page 27 we read, "Sugar exists in the system in several forms, i.e., as milk sugar, as inulin, as hippuric acid, derived from glycocin or jelly sugar, distinct from glycogen or sugar producer." This is likely both to confuse and mislead the student, who may not know that even if inulin be found in the body at all, sugar is not actually present in inulin any more than it is in starch, and who may not be aware that the glycocin or jelly sugar spoken of in one line is a nitrogenous substance perfectly different in its chemical constitution from the non-nitrogenous true sugars mentioned in the adjoining lines. Such errors as these, and others which we have noticed but have not space to mention here, seriously detract from the value of the book, and we trust that in the next edition the author will avoid the carelessness which has allowed them to creep into this.

Extracts from British and Foreign Journals.

Surgical Treatment of Empyema.—Dr. Henry Clarke, of Worcester, U.S., after reviewing the various plans of treatment and methods of operating that have been suggested, remarks that after two thousand years of experience and of prolonged discussion, concerning the expediency of the operation and the method of operating, we come back substantially, so far as relates to empyema, to the simple practice of Hippocrates; that is, to open freely with the knife, and keep the incision open so long as pus continues to collect. We also illustrate, by our success, the wisdom of one of his precepts, "Ubi pus, evacua." The question as to the appropriate time of operating in empyema is an important one. Shall we operate as soon as we have formed a positive diagnosis, or shall we wait until we are satisfied that the efforts of nature are evidently insufficient to effect a cure? We know that in 8 certain proportion of cases recovery takes place. This may be in two ways: first, by absorption, and secondly, by spontaneous opening into the bronchial tubes, or through the outer integuments of the chest. When slightly purulent, the fluid may be entirely absorbed, and even when the pus is quite thick the fluid portions of it may become absorbed, leaving the morphological elements in a solid or semi-solid form in the pleural sac. This, however, is of rare occurrence. The recovery by spontaneous opening into the bronchial tubes is more common, and is estimated by Traube, of Berlin, to be about in the ratio of one to five. This is the most favourable estimate of recovery in this way that Dr. Clarke has seen, and he questions if the average is as good as this. In some cases, where the pus is thus evacuated, the patient succumbs to the exhausting process; others die from suffocation. One such case came under his observation a few years since. who do survive go through a painful and protracted illness. There are other considerations that bear upon the question, as to the proper time of operating:—Is there danger of exciting

inflammation by operating early? Is the operation attended by more success when performed early, or when delayed as long as possible? Is there any danger in the operation itself which affords a reason for delay? Dr. Clarke's experience is insufficient to justify a definite answer to these questions, and writers are not agreed upon the subject. The majority, however, favour an early operation, and claim for it greater success. The views of these authors are forcibly expressed by Lichtheim, in his clinical lecture, "Ueber die operative Behandlung pleuritischer Exsudate." He says:—

"To the question, when shall we operate, there can be but one answer; as early as possible. As soon as a positive diagnosis of a collection of pus in the pleural sac is established, proceed without delay to the operation. Through delay in these cases, only harm can come, for the longer the disease exists, the more unfavourable is the prognosis of a complete recovery. He who waits for the subsidence of the fever will only lose time, and will often, in the end, be obliged to operate while the fever still remains. The fever is only the result of pus in a closed cavity. The best means of allaying it is to let out the pus. To wait, even for the first weeks to pass, in order not to operate during the inflammatory stage, as Küssmaul advises, seems to me unnecessary." "I have operated," he says, "in two cases in the second week of the disease, while there were marked symptoms of inflammation, and in both cases the fever abated immediately after the operation."

On the other hand, the practice of Küssmaul, Prof. Lebert, of Breslau, and others, is not to operate until the acute inflammatory symptoms have subsided. They remove the pus by means of the aspirator, and only resort to free incisions after it has reaccumulated. In the cases that Dr. Clarke reports, he pursued the more conservative course, which, in some cases at least, must be also the wiser one. Nothing is lost by the delay, and there is often much gain in the way of the improved condition of the patient. The removal of the fluid by the aspirator gives immediate relief, and the patient at once improves up to a certain point, which is usually reached at the end of a week or ten days. As soon as the patient has ceased to improve, and it is evident that pus is again accumulating, then is the time to operate by free incision. (Boston Med. and Surg. Journ., August 13, 1874.)

The Antalgic Properties of the Essence of Mint.—In a paper read before the Société de Thérapeutique, Dr. Delioux de Savignac points out that the essence of mint exerts a special influence on the sensory nerves, which diminishes the abnormal vivacity of their reactions when these become exalted into pain-

ful affections. It is comparable in this respect to chloroform, ether, and camphor. Though its high price will prevent its being extensively used in the pure state as an anti-neuralgic and anti-rheumatic, it may be employed in alcoholic solution as an application in the form of liniment, and camphor, chloroform, and laudanum may be added to it with advantage in various cases. Amongst special cases referred to, Dr. Savignac states that it has been found extremely useful in removing the itching and pain of pruritus; in alleviating, when employed in the form of injections of the leaves, the miseries of vulvo-vaginal hyperæsthesia, vaginismus, and neuralgias of the head and face; which are best treated by taking a small ball of wool of the size of a nut, which has been made to imbibe a few drops of the essence, and rubbing the painful part with it gently: it is then covered with a larger piece of wool, and the whole is kept in position for a few minutes with the palm of the hand. success of these external applications of the essence of mint in neuralgias of the face and head, and even in cases of congestive cephalalgia, has been both prompt and permanent. He admits, however, that the cause of the pain must be local for the cure to be permanent, since if it be dependent upon hysteria, or be connected with intermittent fever or with gastric derangement, the primary cause must be dealt with by appropriate therapeutical means. The remedy seems to have been long known in China Intermuscular and parenchymatous neuralgias do not yield to its action very readily, but resist it, as indeed they do that of opium and belladonna; for these he has tried hypodermic injections with success, the formula used being-

> Hydrochlorate of morphia, 1½ grain. Hydrolate of mint, 140 minims. Alcoholate of mint, 15 minims. Mix.

-(Gazette Médicale de Paris, Sept. 26, 1874.)

Eclampsia Parturientium.—Dr. Atenstädt, of Bitterfeld, states that Frerich's view was formerly very generally accepted, namely, that when there was "no albumen, no eclampsia occurs." His own observation, however, as well as that of many other observers, is opposed to this. Wunderlich states, for example, that not only are there no convulsions in many pregnant dropsical patients, and in others suffering from Bright's Disease, but convulsions are by no means common even in non-pregnant patients suffering from Bright's Disease. Blot, out of 205 cases of pregnancy, noted the presence of albumen in the urine in forty-one cases, yet only seven suffered from eclampsia. Litzmann ascertained that albumen was present in the urine in thirty-seven out of 131 pregnant women, and yet eclampsia occurred only in twelve. Spiegelberg holds that our knowledge

of puerperal eclampsia can only attain full development if we start from the proposition that the group of symptoms we term eclampsia has no single cause, but depends on various circumstances which should be made out in each instance. Traube and Rosenstein do not regard the blood as primarily at fault, but refer eclampsia to hyperæmia of the brain resulting from exaltation of pressure in the aortic system, which again, in consequence of the watery character of the blood in pregnancy, leads to acute edema of the brain. Dr. Atenstädt gives the details of several cases that occurred under his care, and from the phenomena presented by them, which appear to have been observed with great care, he draws the following conclusions:—1. The occurrence of eclampsia is connected with the progress (entfaltung) of pregnancy. 2. Acute convulsions with short pauses between them induce labour pains by exciting the uterine nerves. 3. The convulsions of eclampsia are always coincident with very energetic labour pains, and an absence during the pauses. Elderly women carrying their first child, with rigid, unyielding uterine fibres, as well as plethoric subjects, are predisposed to eclampsia. 5. Manual or instrumental excitation of the os uteri and cervix may produce fresh and more general convulsive attacks. 6. Mechanical impediments to delivery—sharp edges of the cranial bones, pressure of the chin in face presentations frequently give rise to eclampsia. 7. Attacks of convulsions are for the most part connected primarily with retarded dilatation of the os uteri. 8. When the head is high, and ballottement can be felt, turning should be adopted; when the head is low, and the os is sufficiently dilated, the forceps should be at once applied, even in face presentations. 9. Eclamptic convulsions are not always arrested by the completion of the act of delivery. 10. The accouchement forcé is the ultimum refugium of an attack of convulsions. 11. Sudden depletion of the vascular system by means of venesection seems to be indicated in women who are plethoric and robust, but it is not always effective in cutting the attack short or in preventing its evil results. 12. Active local depletion by means of leeches below the ears, with steady application of ice to the head, is preferable to venesection. 13. Revulsions applied to the skin are too slow in their action to be of any service. 14. Opium and its preparations may be employed to induce quiet after venesection or other methods of withdrawing blood, otherwise they tend to increase the congestion of the head. The subcutaneous method is the best method of administration. 15. Chloral appears lately to have been used with advantage in the form of clyster in some cases, and the same may be said of the application of chloroform in moderate quantity. 16. There are no certain signs of an impending attack of eclampsia. (Der Practische Arzt, No. 5, 1874.)

A New Method of administering Iodine.—M. P. Collas describes, in the Bulletin Gén. de Thérap. of March 30, a new method of administering this remedy. On account of its strongly irritant action upon the organs with which it comes in contact, iodine is rarely employed in a free state. It must be dissolved in alcohol, and administered with a certain degree of caution. In truth, the tincture should be given with a strongly alcoholic wine, to prevent precipitation upon the walls of the stomach, which would irritate them and infallibly produce vomiting. Moreover, the tincture is of variable composition, for with time the iodine reacts little by little upon the elements of the alcohol, and there is then produced hydriodic acid and hydriodic ether. The attempt has been made to associate iodine with some organic matter capable, by its own re-solution, of delivering up iodine to the economy, as, for example, the iodide of starch. But this preparation is of variable composition—a grave inconvenience to the physician—and, moreover, its taste is rather disagreeable. Pills of iodised albumen present the advantage that the iodine is combined in a constant and known proportion. The iodine is completely masked, and its presence can only be recognised by destruction of the organic matter. This albumen is prepared by agitating actively an albuminous solution with iodine in very fine powder, or in solution in some appropriate vehicle. The mixture is at first highly coloured, blackish brown, but this colour gradually disappears after several hours of contact, and the preparation strikes a violet colour with starch. The product is then desiccated under gentle heat in an air bath, when it may be made into a pill mass. The dose is so arranged that each pill shall contain five milligrammes of The experiments at the Hospital Beaujon, by Prof. iodine. Dolbeau, have shown that iodine thus prepared has no bad effects whatever. The pills, in the dose of five or six per day, act rapidly in the resolution of an hypertrophy of the thyroid gland. Iodised albumen seems to have the efficacy of cod-liver oil. It has been administered in cases of chronic osteitis, ganglionic engorgement, strumous keratitis, and in two cases of Pott's Disease with congestive abscesses. It may be continued for several weeks without gastric derangement or other inconvenience. (New Remedies, vol. iii. No. 13, 1874.)

Belladonna in Spasmodic Asthma.—Dr. George G. Wood prefers belladonna to chloral and all other remedies in spasmodic asthma. To get its good effects, however, it must be given in heroic doses. He usually employs the tincture of the United States Pharmacopæia in doses of twenty to sixty drops, regulating the quantity by the effect produced. It may be given during the paroxysms with great advantage, but it acts

best when given before the attack commences. If the attacks come on after midnight, a dose should be given to the patient just before going to bed, and repeated if necessary to produce sound sleep: he fails to awake at the usual time for the attack to commence, and sleeps on, awakening in the morning very much refreshed and strengthened. This treatment may be repeated night after night, until sufficient time has been afforded to remove the tendency of the disease to recur by change of air and other treatment. When belladonna produces dryness of the fauces and delirium, it should be discontinued, and hydrate of chloral employed in its place, to produce sleep and thus ward off the attacks. (Philadelphia Med. Times, Sept. 19.)

Transfusion of Blood.—A good instance of the success of this plan of treatment is recorded in L'Imparziale. The operation was performed by Prof. Caselli, for Prof. Livi, in the case of a girl affected with lipomania and stupor, who was unable to articulate a single word, or to perform any at all complex movements, and who presented the general appearance of a cataleptic. The blood employed was taken from the carotid of a sheep, two ounces flowing from the vessel every fifteen seconds, and allowed to pass through a tube directly into the vein of the patient. After flowing for this space of time, its further ingress was stopped. In the meanwhile the patient appeared to be revivified. She improved in appearance, made a deep inspiration, gained colour, spoke a few words, and made movements. These effects were persistent, and the patient made a good recovery. (L'Imparziale, No. 11, 1874.)

Treatment of Persistent Neuralgia.—Amongst the many remedies that have been tried for rebellious neuralgiæ, M. Desnos, of the Hôpital de la Pitié, recommends the following combination as being frequently successful; and even in cases where it has failed, if tried again after the lapse of a short time, it may succeed. He first applies over the painful spot three or four mustard poultices, and then rubs into the reddened surface a liniment composed of—

Oil of hyoscyanum, zjss Laudanum, zss Chloroform, zjss. Misce.

--(Journal de Médecine, tome xlv. 8° cahier.)

Milk, Lactation, and Nursing.—The excellent thesis of a pharmacologist whose name is well known in science, M. Charles Marchand, contains documents of considerable interest. Numerous analyses of the milk of the woman have enabled.

him to establish certain facts that are well worth remembering, confirming as they do, or invalidating, various empirical practices. He has shown, for example, that the milk of some women, though abundant in quantity, is ill-fitted for the food of children, and that in consequence maternal lactation is not always advisable or appropriate. Whatever may have been stated, he is satisfied that colostrum is a purgative which purges because it is indigestible and unfitted for nourishment. He points out that the diet of a nursing woman should be varied, and should consist of nitrogenised and feculent food in proper proportions, and that it should not be limited to one kind alone. His analyses show that the best milk is produced by women of from twenty to thirty years of age, though strong and vigorous women can give a sufficient quantity of rich milk long after this period. Certain women who are said to be delicate can also furnish an abundant supply of good milk. Contrary to general belief, fair-complexioned women with light hair and soft muscular system give plenty of good milk. The milk of a multiparous woman is richer in respiratory aliments than that of a primipara, and is therefore to be preferred in wet-nursing. The milk of a woman who is with child is poor in lactine and phosphate of lime, and forms a bad aliment; under these circumstances it is expedient to give the child daily a small quantity, 5 or 6 grains, of phosphate of lime. He states that Bouchard has demonstrated the quantity of milk drawn by a child of average strength to be as follows:-

First day							30 gr	ammes.1
Second day					٠.		150	,,
Third day							460	"
After the firs	t mo	nth					650	,,
After the thi	rd m	onth					750	,,
After the fou	rth 1	nonth					850	,,
From the sixth to the ninth month							950	••

Rather less than these quantities can be given when the diet is mixed. The composition of the milk of the woman and that of the cow are not identical, the latter containing one-fourth more of the albuminous compounds. But if water be added in sufficient quantity to reduce the proteids to their proper proportion, it becomes too poor in butter and sugar of milk; but this may be remedied again by allowing the milk to stand for some time and taking off the upper three-fourths of the fluid, which contains all the fatty matters;—the addition of a fourth part of water containing about two ounces of sugar or a little more to the pint will then render the milk very similar to an equal amount of the milk of the human female. The milk should not be boiled, as this, by coagulating the proteids, renders them indigestible.

¹ One gramme = 15.44 grains.

The mixture forming artificial mother's milk should only be made when wanted. It is unnecessary to thicken the milk with barley, rice, or oatmeal, as these give up but little to water, and are therefore practically innutritious for a child at this tender age. (*Ibid.*)

A safe and ready method of treating Intestinal Obstruction.—Dr. Robert Battey, of Atlanta, Ga., calls attention to the value of the injections of large quantities of water per anum to relieve internal hernia, however produced; intussusception; volvulus; obstruction from malignant disease or by the pressure of a tumour; intestinal spasm, and accumulations of hardened fæces. He gives cases, and demonstrates the safety of injecting two-and-a-half or even three gallons of fluid into the alimentary cavity. He gives one instance of a man who had double inguinal hernia, and in whom that of one side became strangulated. He attempted to reduce it as he had frequently done before, and believed he had accomplished it, but the reduction did not bring relief to his sufferings. Purgatives and opiates were given without removing the pain and vomiting. patient was then chloroformed, and tepid water injected into the rectum, until copious vomitings of discoloured fluid occurred in such quantities as to make it evident that it had passed into the stomach from below. So great was the abdominal tension that the water spouted from the anus, when pressure was removed, in a bold stream to a distance quite two feet from the nates, and continued thus to escape till about a gallon had been discharged before the power of the sphincter became adequate for its con-On recovery from the anæsthesia he passed the enema in successive and large quantities, with intervals of rest, and accompanied by a satisfactory amount of fæces. The relief from pain was prompt and complete; the vomiting ceased at The quantity injected was about twenty-four pints. He claims for this method of relieving intestinal obstruction that it is entirely free from dangerous consequences. (Atlanta Medical and Surgical Journal.)

External Application of Iodine.—Dr. Laborde strongly recommends M. Bouvier's formula for an iodine paint, to be applied externally. It consists of 30 parts of tincture of iodine, $2\frac{1}{2}$ parts of pure iodine, and $1\frac{1}{2}$ parts of potassium iodide. As a revulsive he has found still better results follow a paint composed of tincture of iodine 60 parts, pure iodine 10 parts, potassium iodide 5 parts. This may be twice painted over the part at one sitting, but should not be repeated on the same day, lest vesication should be induced; nor, indeed, is it expedient to reapply it till the epidermis has separated. M. Bouvier employs this paint in Pott's Disease, along the sides of the spine

and over the congestive abscesses so frequently met with in this disease. But M. Laborde finds that it is most useful in serous effusions, as in simple hydrarthrosis, in rheumatic or traumatic effusion into joints, in hydrocele, &c. Even in simple pleuritic effusion it is very serviceable, not indeed in the early stage, but when it is confirmed. It may also be employed in certain congestive states of the viscera, especially in congestion of the liver, acute hypertrophic cirrhosis, and the accompanying ascites. He is accustomed to cover the painted part with a thick layer of cotton-wool; and he points out that it is easy to incorporate with it various calmative remedies, as morphia, opium, and belladonna. It then becomes very useful in relieving the pain of sciatica. (Bulletin Général de Thérapeutique, tome lxxxvii., livraison ii. 1874.)

Section of Median Nerve for Traumatic Neuralgia.— Dr. Weir Mitchell reports an interesting case of a woman who, when a child, ran a splinter of wood into the palm of the right hand, over the point at which the median nerve divides in order to send branches to the thumb and fingers. It was not removed, and the wound healed rapidly. Twenty years after, persistent pain being experienced in the hand and up the arm, in consequence of slight injury to the hand, the splinter was cut down upon and removed, though with great difficulty. On waking from the chloroform intense pain was felt in the hand, producing protracted sleeplessness and constant vigilance to prevent the lightest contact. The whole range of local and general therapeutic means failed to lessen her pain; pressure on the median increased it; but it was discovered that pressure on the musculospiral nerve rendered the hand in the painful part quite numb and painless. After much hesitation, the musculo-spiral nerve was cut down upon and one inch of it removed. Perfect relief followed for eight days, when the pain suddenly returned. Dr. Mitchell gives a very careful and minute account of the symptoms presented by the patient when seen by him. A current of electricity from ten cells passed in either direction produced freedom from pain. The removal of a portion of the median was now decided on, and three-quarters of an inch removed just below the pronator radii teres. Complete relief followed, and the patient with some drawbacks made ultimately a good recovery. The parts of the hand in which there was absence of sensation were surprisingly small. The appearances presented by the nerve were those of Wallerian degeneration. (American Journal of Medical Sciences, No. 135, 1874.)

Treatment of Pruritus Vaginæ.—Dr. Blair states that he has found a dilute solution of tincture of iron an exceedingly effective remedy for this troublesome disease. It has been

equally successful in his hands in cases of pruritus ani. In such cases he endeavours to ascertain if the patients are addicted to opium or chloral, as he has found pruritus caused by this class of medicines when habitually taken. The treatment is then of course obvious. In treating pruritus he does not neglect to give aperients, and he thinks the most suitable is an occasional saline in the morning; a Seidlitz will do very well if taken before breakfast. (Lancet, Nov. 14, 1874.)

Treatment of Psoas Abscess.—Mr. Rivington observes that in treating an ordinary abscess, surgeons hesitate neither in advising nor practising a speedy evacuation, because experience has demonstrated that the more speedy the evacuation the more speedy will be the cure. In some special forms of abscess, such as fæcal and urinary abscesses, an early opening is urgently indicated, as well as in perinephritic abscesses; but in cases of psoas abscess depending upon disease of the spine—and these constitute a large majority with which he has to deal—all experience seems to deter the hand of the surgeon. An early opening has no obvious effect in inducing a tendency to repair in the spinal column. It may relieve pressure on the spinal cord if that should happen to exist, but it appears rather to interfere with and prevent the cure of the main affection. The discharge of the pus is but the signal for lighting up hectic fever, which is too often only extinguished with the extinction of life itself. Mr. Rivington quotes various authors to show that it is imprudent to open psoas abscesses. Billroth in particular speaks very forcibly, and gives the following general rule: "If the abscess comes from a bone on which an operation is impossible or undesirable, do not meddle with it, but be thankful for every day that it remains closed, and wait quietly till it opens, for thus there will relatively be the least danger." Mr. Simon, on the other hand, advocates an early opening. Opinions are as much divided upon the point of the mode in which the abscess should be opened as upon the point of whether it should be opened at all. Some make a free, others a small one: some open by caustics, some with the pneumatic aspirator. Mr. Rivington approves of Mr. Hilton's method, in which, after dividing the skin and superficial fascia with the scalpel, a blunt pointed director is passed through the deep fascia or muscle, and made to enter easily without violence. (Lancet, Nov. 7, 1874.)

Medicinal Employment of Free Phosphorus. — Mr. Ashburton Thompson, in a paper read before the Medical Section at Norwich, states that he has had considerable experience in the administration of phosphorus, and finds that it acts on the human body in three different ways: as a stimulant, as a tonic, and as a poison. 1. As a stimulant, it is possessed of

special powers over the nervous system, which is perhaps affected primarily through the capillary circulation in closest connection with it. Within a few minutes after the administration of a stimulant dose, the pulse rises and becomes fuller, but not firmer; the temperature rises; a general sensation of warmth overspreads the body, the face flushes, and the skin, which may become the seat of much itching and irritation, perspires freely; there appear to be signs of peripheric capillary expansion, and hence the temperature falls three or four degrees; the urine is secreted in unusual quantity; the appetite generally becomes ravenous; the nervous system is relieved from fatigue; and cheerfulness, with occasionally venereal ardour, is felt; more rarely there is increased tactile sensibility. 2. Phosphorus acts as a tonic when given in small doses, repeated at regular intervals, and continued over long periods of time. It is hence beneficial in dementia, and in cases of exhausted nerve functions however produced, whether by mental exertion or consequent upon spermatorrhea. The dose given should begin, when its stimulant effect is required, with one-twelfth of a grain dissolved in a scruple of ether, taken every four hours; when used as a tonic, one-hundredth of a grain may be given, dissolved in cod-liver oil, twice a day. (British Medical Journal, Nov. 7, 1874)

Action of Emetics on Striated Muscles.—Dr. Harnack has observed the curious fact that all the emetics with which we are acquainted have the power of paralysing voluntary muscular fibre, though it is not certain that all muscular poisons are also emetic. Tartar emetic and salts of copper and zinc paralyse the heart and voluntary muscles, both in frogs and mammals. Salts of mercury also paralyse the muscles; salts of lead only do so when enormous doses are given; while salts of manganese and tin do not paralyse them at all, though manganese paralyses the nerves. The emetics of vegetable origin, emetia, apomorphia, cyclamus, asclepia, sanguinaria, delphinia, veratria, digitalin, asarin, and colchicin, all paralyse striated The author attributes the muscular weakness produced by emetics, in part, at least, to their action on the muscles themselves. His experiments seem to show that salts of copper produce vomiting by their local action on the stomach itself, and not on the nervous centres; for the dose required is smaller when it is introduced into the stomach than when it is injected The paralysing action of emetics affords an into the blood. explanation of the fact that large doses of emetics, especially when they are injected into the blood, do not cause vomiting. The muscles are too much weakened by the drug to be capable of the necessary exertion. (Archiv für Experimentelle Pathologie und Pharmakologie, Bd. iii., p. 44.)

Action of Cantharides.—The conclusions drawn by Dr. Cantieri from his experiments on the action of cantharides. administered internally or used as a blister, are, that cantharides introduced into the organism alters the blood, rendering the corpuscles crenated; lessens the contractile power both of the heart and the arteries, and thus lessens the blood-pressure; quickens the pulse, raises the temperature, and, in fact, produces a febrile condition. It causes hyperæmia and stasis, and, if the dose is large, true inflammation in various organs. cerebellum and spinal cord are softened, the softening being greatest at the lumbar enlargement. As a consequence of this, paralysis is observed in dogs, rabbits, and frogs, and it is accompanied in the latter by the loss of reflex action. The hyperæmia of the membranes of the brain and cord is always very distinct at the base of the brain and at the medulla oblongata, and the irritation thus caused may account for the quick respiration, as well as for the quick and sometimes intermittent pulse observed in rabbits and dogs. Cantharides always induces hyperæmia or inflammation of the urinary and genital systems, and in consequence of the desquamative or parenchymatous nephritis albumen appears in the urine. It has an aphrodisiac action, and may produce abortion. When taken internally it produces ulceration of the gastro-intestinal canal, and when injected into the blood, if it does not cause ulceration, it produces diarrheea. Its action as a diuretic is ascribed by the author to its power of lessening the pressure of the blood, and thus diminishing stasis in the kidneys. After giving directions regarding the mode of applying blisters, he states that they do not increase but rather diminish the action of the heart; and when stimulation is desirable, it is better to administer wine, &c., than to use vesi-Cantharides is absolutely counter-indicated as a vesicant in dropsies depending either on active congestion of the kidneys, as in Bright's Disease, or on passive congestion in cardiac disease. He thinks it should not be employed as a counterirritant in inflammations. With proper precautions it may be used as a rubefacient, but sinapisms, &c., are to be preferred. It should not be used in acute diseases, such as typhus. (Lo Sperimentale, tomo xxxiv., fasc. 9 and 10.)

Fermentation in the Stomach with the formation of Combustible Gas.—Dr. Anton Ewald describes a case where vomiting of much acid fluid occurred on alternate days, with the expulsion, per ore et ano, of great quantities of combustible gas, which burned with a yellow flame when lighted. The inflammable nature of the gas was first discovered by the patient, who, when lighting a cigar, found to his surprise that his eructations took fire. Chemical analysis showed the gaseous

eructations to consist of a mixture of carbonic acid, hydrogen, oxygen, nitrogen, marsh gas, and a little olefiant gas. The latter two gave the yellow colour to the flame. On examining the contents of the stomach, it was found that lactic and butyric acid fermentation had been going on in the stomach at the same time as alcoholic fermentation.

Pathology of the Sympathetic Nerve.—Pio Foa has examined the condition of the sympathetic ganglia, especially the semilunar and cervical, in 140 cases of acute and chronic disease. Among the most constant changes were those observed in acute infectious diseases. They consisted of inflammation of the stroma of the ganglia and degeneration of the nervous tissue. The author thinks that the condition of the ganglia may be the cause of the congestion of various organs so frequently met with in infectious diseases. (Rivista Clinica di Bologna, 1874, fasc. 7, 8, and 9; and Centralb. für Chirurgie, No. 29, p. 458.)

Passage of Arsenic and Antimony into the Tissues and Secretions.—MM. Mayencon and Bergeret have discovered that arsenic and antimony can be readily detected by converting them into their hydrogen compounds and allowing the gases to come in contact with a piece of test paper dipped in perchloride of mercury. Arseniuretted hydrogen causes a citron yellow stain on the paper, and antimoniuretted hydrogen a grevish-brown stain. They detect arsenic in the urine of a person taking it by putting about an ounce of the morning urine in a flask with a piece of pure zinc, pure sulphuric acid, and a little sugar candy, and then placing the paper soaked in mercurial solution on the mouth of the flask. By this method they find that arsenic is rapidly absorbed, and appears in the urine immediately. It is some time before its elimination is When no more appears in the urine, but some completed. remains in the body, sulphurous waters aid its complete expulsion. Antimony is absorbed and diffused in the organism more slowly, and its elimination by the urine rarely begins on the first day, and generally only does so after it has been given for several days. Experiments on animals show that arsenic and antimony are eliminated both by the liver and kidneys, but chiefly by the liver. (La France Médicale, Nos. 88 and 89.)

Treatment of Tinnitus Aurium.—Dr. Laurence Turnbull observes that in one class of cases tinnitus aurium is caused by the pressure of cerumen upon the membrana tympani. The treatment in the great majority of cases is simply to remove the offending cause by means of the injection of tepid water in which there is a portion of soda. Numerous cases of this class are relieved by this simple procedure; many of them are of a distress-

ing character. The second variety is caused by excessive growth of stiff hairs in the meatus. The treatment consists in carefully cutting the hairs close up to their point of exit by means of curved scissors, and removing each one when cut. The objection to plucking them out is that it will frequently cause an abscess at the termination of the hair follicle. Another form of this same variety is when a hair becomes detached and falls upon the membrana tympani, from which it must be removed by means of a camel's-hair pencil slightly moistened in glycerin. The third variety of cause is when adhesive mucus is on the posterior surface of the membrana tympani, middle ear, or mastoid cells. This is removed by a few blasts from Politzer's air-bag or douche; if this means be not effectual, paracentesis of the membrana tympani and washing out the middle ear with a solution of sodium biborate or sulphocarbolate in warm water. At the same time attention must be given to the naso-pharyngeal region, with the use of the nasal douche, sprays, and gargles. In the fourth variety, where foreign bodies are in the Eustachian tube, the treatment consists in reversing the action of the air-bag by withdrawing the air by means of an elastic catheter in the pharyngeal orifice of the tube, and compressing the nostrils, or by means of bag and curved glass tube introduced by the mouth as near as possible to the mouth of the tube, and rarefying the air. Should the foreign body produce inflammation, with effusive bulging of the membrane, its escape should be facilitated by perforation of the membrane by an aspirator-needle. In the fifth form, or pulsating tinnitus, the result of some alteration in the blood-vessels. anæmia, or excessive action of the heart, we must try compression of the temporal or carotid artery, diminishing the frequency of the heart's action by aconite or digitalis; or, if the patient is anæmic, administer the salts of manganese, or the lactate or citrate of iron, with good nourishing diet and outdoor exercise, avoiding all forms of excitement, as dancing, violent exercise, or mental In the sixth class we must make a careful diagnosis by exclusion to discover whether we have excitement of the brain causing subjective noises, or on the other hand the exhaustion from over-effort of the brain or some drain upon the nervous system; for in the first instance we resort to large doses of bromide of potassium, or, if there be any suspicion of syphilitic complication, add the iodide of potassium until we produce bromidism on the one hand or iodism on the other, with its characteristic eruption. If it is the second instance from exhaustion, we resort to a solution of phosphoric acid employed in the form of a lemonade, or to the phosphites or hypophosphites, in conjunction with strychnia or its salts, with the use of the galvanic current, to complete the cure. In the seventh class of cases the operation of tenotomy of the tensor tympani is to be recommended, and the

mode of operation is that of Dr. Fr. E. Weber, of Berlin, which has been employed in a number of cases with more or less success, depending upon the cause. In the eighth class of cases, which are generally the result of a patulous condition of the orifice of the Eustachian tube, the remedy should be the application of a powerful solution of nitrate of silver or sulphate of copper or carbolic acid to the mouth of the tube, and washing by the use of the double Eustachian catheter, together with the internal use of strychnia, to stimulate the muscle to contract and close the orifice. The ninth class, is where the "Aspergillus" is present, and the vegetable parasite is to be removed by the forceps and a warm saturated solution of sulphite of soda, whilst the discharge of mucus or serous fluid is to be checked by the use of an injection of a strong solution of sulphocarbolate of zinc. A number of these cases of a mild character may be seen after the summer season in patients who have allowed the sea-water to damp the hair and pass into the ears. In these cases a mild solution of an astringent, acetate of lead or sulphate of zinc, will remove all the symptoms of itching, deafness, and distressing tinnitus, in a very short time. (Philadelphia Medical Times, June 1874.)

Croton Chloral.—Dr. R. Engel states that according to Liebreich, croton chloral, administered internally, rapidly produces slumber similarly to ordinary chloral, but without its use being followed, as in the case of the latter, by lowering of the pulse and respiration. Even after the administration of very high doses of croton chloral the pulse is not reduced. The author thinks that it is not to the first product of decomposition (allyl-chloroform) that hypnotism is due. Allyl-chloroform, being very unstable, breaks up immediately, and he thinks therefore the action of croton chloral should be attributed to bichlorallylene. Moreover, Liebreich has found that bichlorallylene, when administered to animals, does not reduce the circulation or respiration. paring the effects of chloroform and chloral on the one hand, and bichloride of ethylene and bichlorallylene on the other, he considers himself justified in asserting that whilst the trichlorinated substances act upon the brain, spinal cord, and heart, the bichlorinated substances act only upon the brain and spinal cord. In none of his experiments has Liebreich recognised any hurtful effects on the stomach or any other organs; and he reports that he has employed it very successfully in cases of facial neuralgia, the pain ceasing frequently before sleep is produced. Jules Worms, however, asserts that croton chloral is not so generally tolerated as chloral, and George Gay says that its narcotic action is more uncertain. Croton chloral is hypnotic in doses of from 7 to 15 grains. It may be administered in solution in water,

or in glycerine. The following is the formula employed by Jules Worms:—

Croton chloral, 1 gramme. Glycerine, 60 grammes. Water, 60 grammes. Oil of peppermint, 3 drops. Simple syrup, 25 grammes.

In a paper contributed to the American Practitioner by Mr Louis Diehl, of Louisville, he remarks that croton chloral hydrate differs from the ordinary chloral hydrate by its sparing solubility in cold water, and in the exceedingly irritant character of its vapour. Chloral hydrate, on the contrary, is freely soluble in water, and its odour when pure is not irritating. From these experiments it follows that croton chloral hydrate (commercial) may be dispensed in aqueous solution of a strength corresponding to two grains in the fl. drachm, and Mr. Diehl gives the following formula:—

R. Croton-chloral hydrate, gr. viij.
 Warm water, fl. 3j.
 Simple elixir, fl. 3vij.
 Ft. solut.

Owing to the alcohol contained in the simple elixir, a larger quantity than two grains to the fl. drachm could, if desirable, be incorporated and held in solution by the above mixture.

Pepsin.—Dr. Edes considers that much of the dissatisfaction with pepsin expressed by physicians is due to the use of preparations which contain little or none of it. He has examined the digestive powers of different preparations of pepsin. He finds that Morson's and Boudault's, as well as a much-advertised "Aromatic Liquid Pepsin," have hardly any digestive action. Proctor's and Hawley's, on the contrary, were exceedingly active. These preparations were probably made by the process of Mr. Scheffer, of Louisville. This consists in macerating the chopped mucous membrane of a pig's stomach in acidulated water, and after allowing the mucus to settle, precipitating the pepsin by a saturated solution of common salt. The precipitate is dried upon a cloth, its digestive strength estimated by experiment, and then mixed with sugar of milk in such proportion that 10 grains dissolve 120 grains of hard-boiled white of egg in four to six hours under the appropriate conditions. Pepsin wine is feeble, but not necessarily inert. Elixirs of pepsin and bismuth are useless, for bismuth precipitates pepsin and renders inert the liquid supposed to contain it. If it be desirable to administer pepsin and bismuth to the same patient, they ought to be given separately. Pepsin should be administered with NO. LXXVIII. GG.

45. INTLA TO ILLY BEILSH AND FOREIGN JOURNALS.

an all and with as few drugs as possible. A small amount of alloched is not inadmissible, but a large amount retards digestion. Its beneficial article is not limited by the amount of albumen which it dissibles in a test-tube without change or renewal of any of its contents. In Edes does not appear to have tried process in the P. Specimens of this obtained from Messrs. Publick and Leyholds have shown themselves to possess very great directive power. — Buston Med. and Surg. Journ., 1874, vol. and all p. 3.

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¹ Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Bailliere, of King William Street, Charing Cross.

Department of Public Bealth.

SCARLET FEVER PRESERVES.

THE present prevalence of scarlet fever suggests the consideration of the status of this disease in the kingdom. It appears to be becoming, if it have not already become, supereminently the "English plague." During the twenty-one years, 1851-71, it killed on an average 18,400 persons yearly, and its annual mortality ranged from 9,000 to 32,500. Within this period there were five epidemics of the disease. The two earliest of these epidemics each lasted a year; the two next lasted each two years; the last epidemic extended over no less than four years. The first epidemic occurred in 1852, and killed 18,887 persons; the second in 1854, and killed 18,928; the third in 1858-59, and killed 43,021; the fourth in 1863-64, and killed 60,175; the fifth in 1868-71, and killed 100,663. The following are the figures of the mortality from the disease year by year:—

ENGLAND—Deaths from Scarlet Fever at all ages.

1851	•••	•••	13,634	186	3	•••	30,475
1852	•••	• • • •	18,887	186	4	•••	29,700
1853	•••	•••	15,699	186	5	•••	17,700
1854	•••	•••	18,928	186	6	•••	11,685
1855	•••	••	16,229	186	7	•••	12,300
1856	•••	•••	13,557	186	8	•••	21,912
1857	•••	•••	12,646	186	9	•••	27,641
1858	•••	•••	23,711	187	0	•••	32,543
1859	•••	• • •	19 ,31 0	187	1	•••	18,567
1860	•••	•••	9,305	1			
1861	•••	•••	770,6	(TOTAL	•••	388,340
1862	•••	•••	14,834	\			

The remarkable development which the disease has undergone in the latter part of the period under consideration, as compared with the former part, will at once arrest attention. greater facility of comparison, the period of twenty years, 1851 to 1870, is taken, it is found that the mortality from scarlet fever in the first ten years was 161,906; in the last ten years, 207,867. Again, if the two periods be compared as to epidemic prevalence, it is found that the disease was epidemic in four years of the first ten, and five years of the second ten. But this statement does not represent the whole epidemic difference of the two decennial periods. It is requisite to add to it, rightly to understand the difference, the facts relating to magnitude of epidemic prevalence and to duration. The epidemic mortality in 1851-60 was 80,836; in 1861-70, it was 142,271. The duration of the epidemics in the two periods differed as greatly as the magnitude of their mortality. In 1851-60 there were three epidemics, two of one year each (1852 and 1854), and one of two years (1858-59). In 1861-70 there were two epidemics, one of two years' duration (1863-64), and one (unexhausted until 1871) of three years' duration (1868-70).

The swollen mortality of the ten years, 1861-70, and the great duration of, and exceptional loss of life in, the last epidemic—the epidemic of 1868-70, or more correctly of 1868-71—are facts deserving of very serious attention. They appear to indicate a progressive growth of the malady—such growth, in fact, as might be inferred from its highly infectious nature under conditions of largely increasing urban populations (actually as well as relatively to rural populations), and absence or inefficiency of means for preventing the dissemination of the disease. There are not wanting certain considerations which give some countenance to this inference, and which we propose briefly to consider here.

The two Parliamentary returns on the Average Annual proportion of Deaths from specified causes at certain ages in England, the one relating to the ten years 1851-60, the other to the ten years 1861-70, enable us to compare in several details the relative prevalence and distribution of scarlet fever throughout England during the periods to which the figures we have given refer. From these returns we obtain the following Table relating.

to the mortality of scarlet fever in the several Registration Divisions of England during the two decenniums:—

SCARLET FEVER—Deaths per 100,000 living at all ages.

			1851-60.		1861-70.
ENGLAND AND WALES	•••	•••	88	•••	97
1. London	• • •	•••	94	•••	114
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It will be observed from this Table that, with the exception of the South-Western Counties, the mortality from scarlet fever was greater throughout the whole kingdom in 1861-70 than in This increased mortality in seven of the divisions did not reach the average of the whole kingdom, and in one of these divisions only, Monmouth and Wales, did it exceed the average of 1851-60. But in four divisions the mortality was greatly in excess of the average, and the four divisions in excess in 1851-60, were also the divisions of excess in 1861-70. divisions in question are London, the North-Western Counties, Yorkshire, and the Northern Counties. That is to say, that the divisions of persistent high mortality from scarlet fever, and it may be assumed of persistent excess or prevalence of the disease, are the divisions containing the metropolis and our great towns, and which constitute the principal districts of commercial and manufacturing and mining activity. So far back as our data extend of the prevalence of scarlet fever in this country, the same fact is observed, these divisions always and invariably having an excessive mortality from the disease.

If the analysis of distribution of mortality be pushed more into detail, it is found that the excess in these divisions is determined solely by the mortality of the sub-districts containing the great urban populations. Of the 10 sub-districts of Cheshire, those of continuous excess are Stockport, Northwich, and Birkenhead. Of the 26 sub-districts of Lancashire, all great manufacturing or mining districts, with the exception of Clitheroe, Chorley, Fylde, and Garstang, the four named districts alone escape the excess. Of the 60 sub-districts of Yorkshire, the excess is almost solely confined to the 13 which contain the great woollen, mineral, and metal-ware towns. Of the 37 sub-districts in the Northern Division, the 13 districts of excess are also the crowded industrial, that is, mining and mineral districts.

In the remaining divisions there are several districts of excess, but these are numerically few in number. Here, as in the other divisions, those districts are great industrial centres. Thus, in Gloucestershire, Bristol and Clifton form a district of excessive mortality; in Staffordshire, the different sub-districts which contain the Potteries; in Warwickshire, Birmingham and Aston. Again, in Monmouth, Pontypool forms a district; in Glamorganshire, Merthyr Tydfil, and so forth. The whole of the districts of continuous excessive mortality during the twenty years 1851-70, regarded topographically, do not appear to exceed twenty-three in number. These districts contain an aggregate population of about 11,000,000—that is to say, half the population of England.

It may be said, of course, that there is nothing here but an example of a well-known phenomenon, that an infectious disease is most mischievous amongst the populations which are densest, and among which movement is greatest. There is much truth in this view, but there is a mode of regarding it calculated to give it a different aspect from that commonly apprehended. has been suggested that these districts of excessive mortality should be called Scarlet Fever Fields, after the manner in which Dr. Farr designated the districts of excessive prevalence of cholera, "Cholera Fields." The term, we think, is not so happy as it might be for conveying the peculiar signification, in regard to scarlet fever, which was intended to be attached to it. It was assumed that these districts were the persistent sources of infection of the kingdom,—that in them the infection of the disease was never absent, that a continuous succession of it was maintained there from month to month and from year to year, and that

during its epidemic developments infection spread beyond them and was disseminated widely in other districts less favourable to its maintenance. From this point of view a better designation for these districts, we think, would have been *Scarlet Fever Preserves*, and such we have named them in the heading of this article.

There is much to be said in favour of the foregoing assumption. It is consistent with practical experience of scarlet fever in several districts adjacent to great towns, and with what is known by experience of its prevalence in urban districts. The data do not exist, perhaps, by which its accuracy could be established statistically; and, indeed, this is rather a question of local than of general inquiry. It is one deserving the attention of medical officers of health, who alone can deal with the minute details by which it can be fully tested. It should be remembered, however, that every year adds to the difficulty of such investigations, by increasing the freedom and rapidity of intercourse among the different communities in the kingdom.

The practical importance of the view involved in the assumptions must be obvious. If this be correct, our hopes of insuring any permanent effect in diminishing the prevalence of scarlet fever in England must rest upon the success of the measures adopted to this end in the Scarlet Fever Preserves. Practically little or nothing has been done to this end as yet. London is now setting the example of organised measures for the purpose; and it is to be hoped that other great urban districts will follow the example of the metropolis with regard to the essential matter of permanent as well as temporary hospital accommodation for the isolation of scarlet fever, as also with regard to the numerous detailed measures of disinfection.

INTERNATIONAL HYGIENE.—THE DIFFUSION OF . CHOLERA IN EUROPE.

A SERIES of papers, published by the Local Government Board, on the recent diffusion of cholera in Europe, will probably complete all the data we are likely for some time to obtain

on the origin of this diffusion. The diffusion in question refers to the prevalence of cholera in Europe, which began in 1869, and ended (let us hope) this year. The diffusion commenced in South Russia, and was regarded by Russian physicians as a recrudescence from the unexpired diffusion of 1865-68. In May, 1873, Mr. Netten Radcliffe, in a report presented to the Local Government Board, directed attention to the fact that the official data of the progress of cholera in Russia, in the possession of the English Government, yielded no evidence of such recrudescence; while on the other hand they showed that the appearance of cholera in South Russia in 1869 had followed in succession upon great epidemic prevalence of cholera in North-western India and in Persia. showed, also from official data, that about the time of the appearance of cholera in South Russia, namely, in 1869, a more direct route of commercial communication between Persia and Russia, through Transcaucasia and South Russia, had come into large operation, and that the appearance of cholera in South Russia was coincident with the establishment of this route, cholera at the time being widely prevalent in North Persia. The question thus raised had important practical bearings upon international hygiene, particularly in reference to measures of quarantine. If Russian medical opinion was right, maritime quarantine, as practised against cholera in European ports, was absurd; if Mr. Radcliffe's suggestion was right, it was obvious that the communications between Russia and Persia were becoming so close, that cholera might at any moment be introduced without warning by this route into Europe, and the frontier quarantine suggested by the International Sanitary Conference of 1866 would be simply impracticable. Anyway, it was desirable to obtain some precise data on the subject, and, at the suggestion of Mr. Simon, Mr. Radcliffe's report was communicated to the Russian and other foreign Governments.

The papers published by the Local Government Board contain the reply of the Director of the Medical Department of the Russian Government, Dr. Pelikan, to Mr. Radcliffe's report, and Mr. Simon's and Mr. Radcliffe's observations on that reply. Dr Pelikan includes with his answer a memorandum on the measures for the prevention of the introduction of cholera and plague from Persia into Russia; also a report by Dr. G. Arkhargelsky on the origin and importance of the cholera epidemic of 1852-55. The memorandum is instructive, as showing how Russia has been led by force of facts and extension of commerce to come to much the same conclusions in matters of quarantine as England. Dr. Arkhangelsky's report (translated from the Russian) for the first time gives from official sources a detailed account of the beginning of the epidemic of 1852-55. This paper is an exceedingly important contribution to epidemiology. Both Dr. Arkhangelsky's report and Dr. Pelikan's reply are enriched with maps, showing the distribution of cholera in Russia at certain periods.

Dr. Pelikan's reply is written apparently under some feeling of irritation, partly arising from a curious assumption, that Mr. Radcliffe's report must have some ulterior object of fastening a responsibility upon Russia, which she could not accept, of protecting Europe from migrations of cholera across her Persian frontier. So little is Dr. Pelikan acquainted with English feeling and practice as to quarantine, whether land or sea! He affects to regard Mr. Radcliffe's report as having no scientific aim, and then proceeds to give the data upon which the opinion of Russian physicians is founded as to the origin of the epidemic of 1869-74. He states (according to Mr. Radcliffe's summary)—

- (a) That from the introduction of cholera into European Russia during the invasion of 1865 to its reappearance in Kiev in 1869, the disease had been uninterruptedly present in parts of that division of the empire.
- (b) That in 1868 the disease showed itself in an epidemic form only in certain localities of the province of Kiev.
- (c) That the diffusion which began at Kiev in 1869 extended from that city as from a centre.
- (d) That the new route by which it had been suggested cholera might have been conveyed to Kiev from the infected districts of Persia, and the whole of the great tract of country intervening between these districts and Kiev were, at the time of and immediately preceding the outbreak, entirely free from the disease.
- (e) That the route referred to at the time in question was so little developed as to exercise no influence upon the movement of trade from Persia.

Mr. Radcliffe, however, in his observations, shows two remarkable sources of fallacy in this statement. The first is, that it is obvious from Dr. Pelikan's statement that no suspicion existed in Kiev for several months after the beginning of the outbreak

of 1869 that the cases belonged to a new outbreak of diffusive cholera, and might have connection (as subsequently believed) with pre-existing cholera in the provinces. The early cases and groups of cases were believed to be ordinary *cholera nistras* occurring at a time of pilgrimage; and clearly no search such as is necessary to disclose origin was made into such origin.

The second source of fallacy arose from the fact that Russian physicians in Kiev were seemingly quite unaware of the chronological relationship of the appearance of cholera in 1869 with preceding movements of the disease in India and Persia, and consequently assumed the connection of the disease at Kiev with pre-existing disease in the provinces, where its epidemic nature became obvious, not knowing that another source was possible and even probable. They were ignorant, in fact, that the disease might be an epidemic newly migrating from India, masked, it may be, by the hardly expired epidemic of 1865-66. The scientific importance of this question has wholly escaped Dr. Pelikan. It is necessary that it should be kept in mind, for it is to be remembered there is no such complete means of ascertaining data or of their publication in Russia as. here; and Dr. Pelikan's statements of facts and figures should be read with the reservation which the knowledge of this deficiency prompts. We think, official reticence notwithstanding, that Mr. Radcliffe's and Mr. Simon's memoranda should have contained some observations on this question; for, as Dr. Pelikan's and Dr. Arkhangelsky's statements stand, they may be read as having the same value as English statements. Note, for example, that no reference is made throughout the papers to diarrhea in relation with cholera. Indeed, if we mistake not, trustworthy statistics of cholera did not exist even for St. Petersburg until 1870.

We quote Mr. Radcliffe's statement of the considerations which prevent him accepting unreservedly Dr. Pelikan's conclusions:—

"The importance of the question rests upon the chronological relations of the outbreak of cholera at Kiev in 1869 with preceding outbreaks in Persia and Hindostan. I had to approach the study of the diffusion of cholera in Europe, which began in 1869, not only with a knowledge of the previous prevalence of the disease in Persia, but also with a knowledge of that prevalence having been preceded by a great extension of cholera in Northern India. Cholera in 1867, following in the track of pilgrims returning northwards from the Hindu religious festival at Hurdwar, migrated into Afghanistan. The multitude of pilgrims who

had assembled that year at Hurdwar had been very great, and cholera had broken out among them with unusual fierceness. Inspector-General Dr. John Murray, who at that time minutely studied in the North-west Provinces the progress of the disease northward, came to the conclusion that he witnessed the beginning of another great migration of cholera. The disease broke out in Cabul in July 1867, and during that month and the earlier portion of August is reported to have carried off 8,000 people. It spread to the villages in the vicinity, which are stated to have suffered severely; but of the further history of this dissemination nothing is known. In July 1868, cholera, as described in my letter, broke out at Meshed, the principal centre of trade between Persia and Afghanistan, at a time when the city was crowded with pilgrims from all parts of Persia, and this outbreak proved to be the beginning of a new migration of cholera into Northern, Western, and Central Persia. When this outbreak occurred, cholera, the relies of a previous diffusion, existed in Mazanderan, and from the movements of the disease in that province, it was inferred as most probable that it had been brought thence into Meshed, and there, amidst the great concourse of pilgrims, had found the conditions for increased activity. In fact, precisely as Dr. Pelikan inferred in the case of Kiev in 1869, Dr. Tholozan, the physician to the Shah, inferred of the outbreak at Meshed in 1868, that it was a recrudescence of an unextinguished preceding diffusion. This inference was formed, however, without any knowledge of the migration of cholera from India into Afghanistan, and its great prevalence at Cabul, in the preceding year.

"The chronological sequence of the several successive outbreaks and diffusions of cholera, in Northern India and Afghanistan, in Persia and in Russia, here briefly referred to, suggested that they were not disconnected phenomena, but that they were parts of a new migration of cholera commencing in India in 1867. Reviewing the several outbreaks together, this is the probability which first presents itself for examination, and until this examination has been exhaustively made it is premature to conclude that the outbreaks of 1868 in Persia, and 1869 in Russia, were recrudescences solely. Further, in conducting such an examination it must be remembered that the phenomena of recrudescence may probably mask the phenomena of migrating cholers. This was the second question I raised in my letter. The local conditions which appeared chiefly to favour recrudescence at both Meshed and in South Russia coincided with periods in which there was a probability of freshly migrating cholera from Persia and India.

"A moment's consideration will show the essential necessity of an examination such as that which is here insisted upon, if the problem which will present itself, should the opinions of Dr. Pelikan and Dr. Tholozan as to the origin of the outbreaks of 1869 in South Russia and of 1868 in Persia be confirmed, is to be approached with the hope of successful solution. The successive development in successive years of three great original diffusions of cholera in contiguous countries, each diffusion unconnected with the other by the transmission of the disease through the agency of infected persons from one region to the other (such transmission obtaining amidst the various localities within the area of each diffusion), will prove a problem of surpassing interest even among cholera problems, and should be most carefully cleared from sources of fallacy."

Mr. Simon's observations upon the question raised by Mr. Radcliffe, and of its bearing upon international hygiene of Europe, are full of interest. He, it may be said, accepts Mr. Radcliffe's reservations.

- PROFESSOR PARKES'S REPORT ON HYGIENE.

(FIRST NOTICE.)

Dr. Parkes's Report on Hygiene for the year 1873, recently published in the Fourteenth Annual Report of the Army Medical Department, is, as usual, full of interest. It is much to be regretted that the annual invaluable current criticism and account of the progress of hygiene by the learned professor at Netley is not published in a separate form, after it has appeared in its proper place in the departmental report. cannot but think that if proper representations were made to the War Office this would be done. It is most desirable that this report should be issued in a form which would make it readily accessible to all who are interested in public hygiene, particularly to medical officers of health. It is true that the cost of the Report of the Army Medical Department (6s.) is not oppressive, and that in addition to Dr. Parkes's report it contains usually much instructive matter, not necessarily peculiar to the service. But Dr. Parkes's current reports on hygiene concern all workers in hygiene, and not army medical officers only, and it is much to be wished that they could be obtained in a separate form.

The wealth of material in the present report, as in previous reports, makes it difficult for a reviewer to deal with it. We propose briefly to indicate the subjects treated in it, and to quote such illustrations from it as may show the nature of the information it contains, and send readers to it.

The first portion of the report is devoted to food, and certain questions which have arisen under the operation of the "Adulteration of Food Act" are treated at some length. Dr. Parkes examines Mr. Wanklyn's method of ascertaining the falsification of milk with water, by determining the solids. He dissents from the standard adopted by Mr. Wanklyn, as liable to lead to error and give rise to difficulties in a court of law, and he suggests the adoption of another standard. Dr. Parkes disagrees with

Mr. Wanklyn as to the utility of taking the specific gravity of milk, and observes:—

"No doubt, when it can be done, the determination of the solids by weighing is the best. But when the specific gravity is taken with due regard to temperature and amount of cream, it gives why iseful information, and in many large establishments, such as hospitals and large cooking places, where daily evaporations and weighings could not be carried on, the specific gravity gives a most convenient control over the salesman, which it would be a pity not to utilise. If a specific gravity of 1023, at a temperature of 60°, and cream to the amount of given is ensured, we shall at any time know that no great amount of water has been added."

After some observations on the examination of butter, Dr. Parkes discusses the examination of tea, and gives a detailed scheme for the purpose. Finally, in terminating this part of his report, he enters into an examination of the recent diversities of opinion among chemists on the discovery and mode of discovery of alum in bread, concluding that "on the whole, it seems preferable to ashere to the old method of testing; to use only platinum vessels, or, if only porcelain can be got, to make careful blank experiments with pure bread, and in every case to repeat the experiments on a second portion of the alumed bread."

A few lines are devoted to a cystic parasite described by Surgeon-Major Oldham, which is common among sheep in the Punjâb, and which Dr. Parkes suggests is perhaps the cysticercus described by Cobbold some years ago in the sheep.

The second part of the report, relating to Air, describes the more recent researches on solid bodies floating therein, and on the inhalation of gases and vapours. We would note here Hirt's observations on the uninjuriousness of the stinks from putrefying substances among workers therein. On these observations Dr. Parkes remarks: "What is the exact composition of these odours? They are, no doubt, of organic nature, and not stable like gas. Consequently they are probably destroyed soon after their absorption into the blood, or they may not be absorbed at all, but remain outside the body. That they render the workmen actually healthier, as Hirt implies, seems unlikely, and possibly the high wages given in these repulsive trades, and the better food thus obtained, may have much to do with the high standard of health."

The third part of the report, devoted to Soil, has some interesting observations on the relation of changes of ground-water to mortality in Berlin and to typhoid fever.

The fourth part of the report treats on questions of Sewage. Here Dr. Parkes refers to the desirableness of some more familiar information being had in this country as to the application of Captain Liernur's pneumatic system, and expresses a strong opinion that the Government ought to institute an inquiry on Captain Liernur himself, however, has recently visited England and been in communication with many sanitary authorities. It might be desirable to have some independent account of the working of his system in Leyden and Amsterdam, but Captain Liernur may be safely left to describe his own system unaided. We fancy, however, that the diffi-· culties which appear to be almost peculiar to English manufacturing towns meet him here for the first time, and we wait with no little interest to learn the suggestions he may make to the towns he has visited. He is an accomplished engineer, and he brings a wholly new kind of experience to bear upon our sewage difficulties.

Dr. Parkes discusses the value of the earth-closet manure from the results of certain analyses made by Dr. Voelcker, and he concludes that "the results are very unfavourable to the prospect of using the earth-closet in large communities, as the expense of bringing, drying, and distributing, and then carrying away the earth, cannot be compensated by any adequate return. These (Dr. Voelcker's) analyses are, in fact, well worthy the consideration of any community, large or small, which contemplates the establishment of an earth system."

To those who know the high value placed upon the earth-closet manure by many who have used it in garden operations, and the value assigned to the manure from the results of these operations, this conclusion will be a surprise. But Dr. Voelcker states that this assigned value rests upon no solid foundation. Dr. Parkes, in remarking on "adequate returns" from the dry-earth system, must be understood, it is to be presumed, as referring to the "commercial," not the "hygienic" return.

The fifth part of the report is given to the specific diseases.

Here the report is so rich in material that we have difficulty in selecting illustrations from it.

The first section relates to typhus in India, and the certain identification of the disease in the Punjâb, not only in gaols, but among the population at large. Well may Dr. Parkes observe that it is difficult to over-rate the value of this discovery. It had long been suspected here that the discordancy of medical opinion in India on "fevers" there, arose from several forms of febrile disease, having different qualities, being confounded together or insufficiently distinguished. The recognition of the commonness of enteric fever in that country, and now the further recognition of typhus, prove how true this suspicion was. Thanks to Netley, medical research in India is rapidly approximating to European research, and the difficulties which have so long overclouded our knowledge of disease there are steadily but surely diminishing.

The more important portion of this part of Dr. Parkes's report is taken up with a discussion of the etiology of typhoid fever and certain questions of cholera, but a consideration of his observations on these subjects must be postponed until our next number. A few lines are also given by Dr. Parkes to yellow fever and to malignant pustule.

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